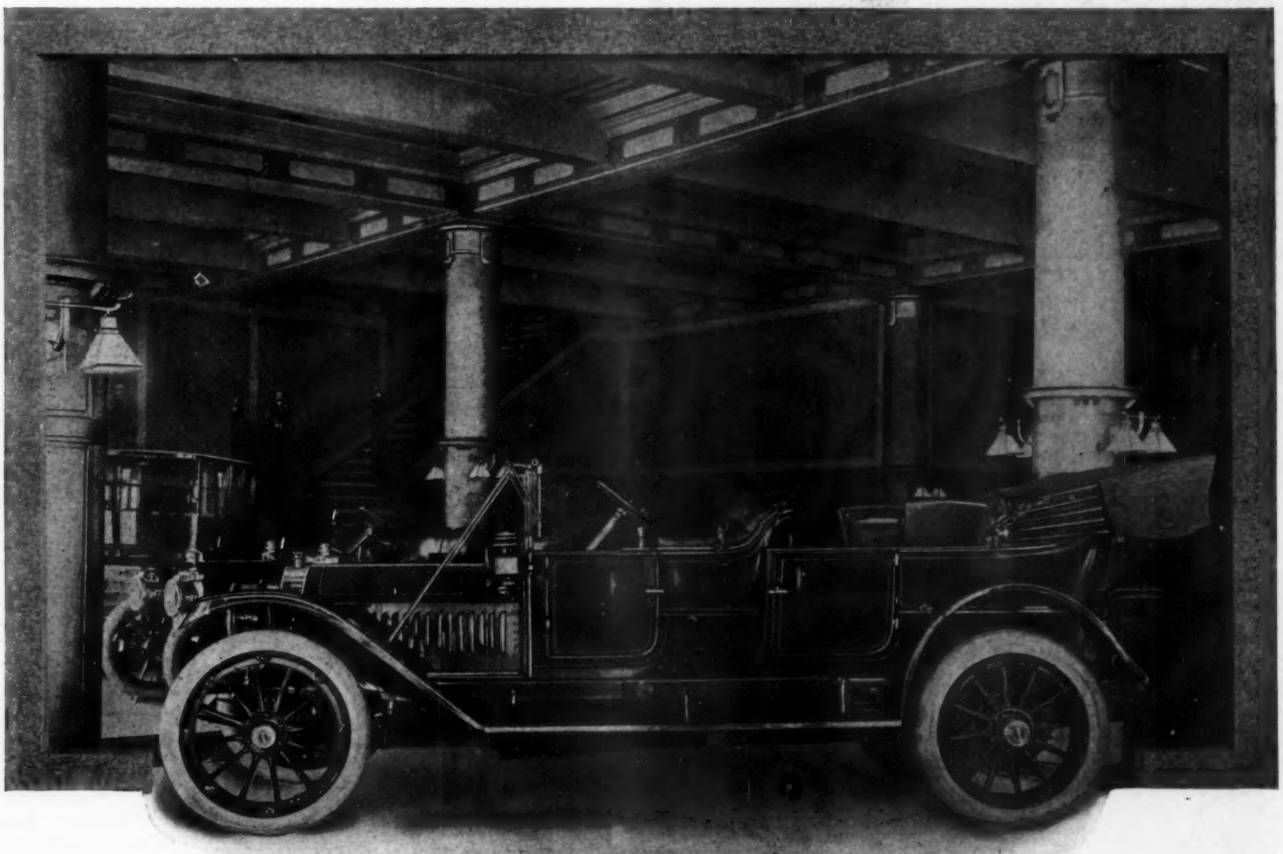
VOL. XXIV. NEW YORK—THURSDAY, APRIL 20, 1911—CHICAGO No. 16

THE AUTOMOBILE

Curtain Raised on Chicago's "Row"

Portraying Automobile Activity and Much of Enterprise.



TYPICAL CHICAGO AUTOMOBILE SALESROOM—LOCOMOBILE

CHICAGO, April 17—There are 112 different makes of pleasure automobiles sold on Chicago's "Automobile Row." A painstaking canvass of that splendid sales field undertaken by THE AUTOMOBILE showed that the total number of cars disposed of in Chicago reaches the astonishing number of 24,500 annually. Chicago does not take all of these cars for use of her citizens, as many of the selling concerns hold distributing rights over a wide territory and only a few are strictly limited to urban sales. For instance, the Locomobile Company of America, which has one of the finest selling establishments in the country located in Chicago, serves all the territory from Ohio to the crest of the Rockies from the middle western branch. This concern handles over one-quarter of the factory output and all of it is credited to the Chicago branch.

The city of Chicago alone buys 15,000 automobiles each year, the remainder of the total sales, 9,500 cars, going to outside territory. The average price realized from automobile sales in Chicago is considerably lower than it is in New York on account of the number of smart little runabouts and touring cars of moderate price that have proved so popular in the Windy City. It is estimated that the average cost of the cars sold in Chicago is $1,650, which is only a shade over the general average of all the cars sold in the United States and about $350 less per car than those sold in New York. This is accounted for in a measure by the fact

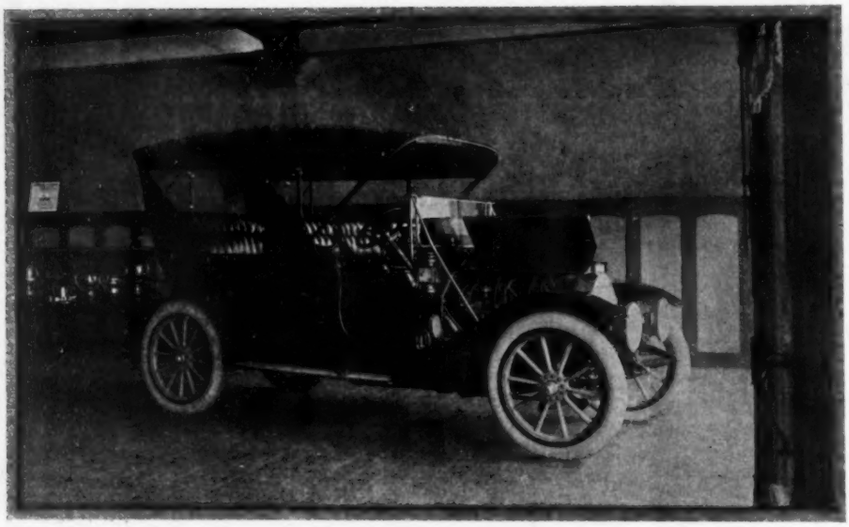


Fig. 1—The Pierce-Arrow is sold in Chicago by Paulman & Company, 2420 Michigan avenue

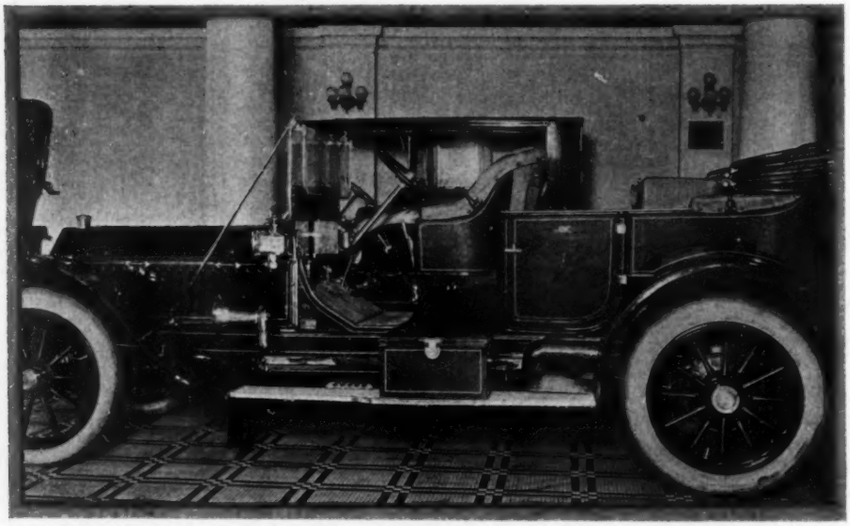


Fig. 2—Showing the interior of the beautiful Peerless salesroom, 2500 Michigan avenue

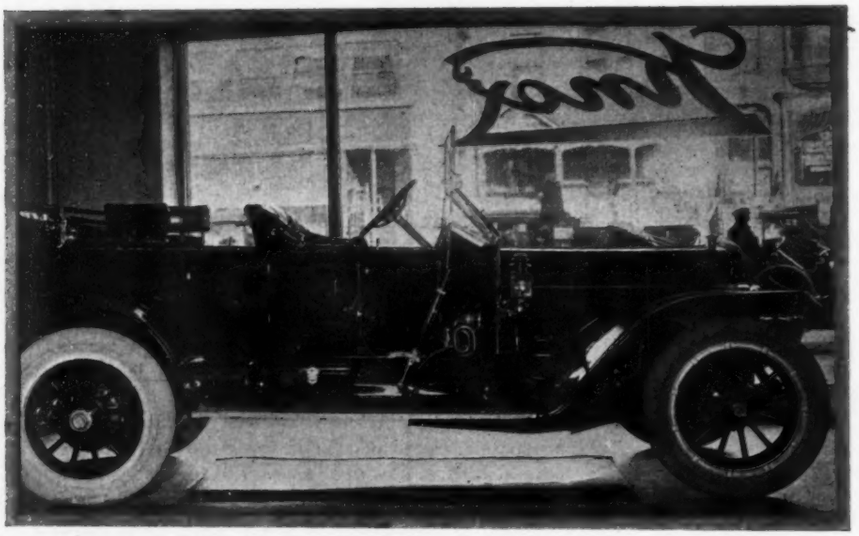


Fig. 3—The Knox Automobile Company of Illinois, 1458 Michigan avenue, whose trade is lively

that an immense number of low-priced cars are sold in outlying territory, the Ford branch, for example, having an allotment of 2,400 cars for 1911. Then, too, the Henry and Nyberg companies have their general distribution headquarters on Michigan avenue and as both expect to sell a large number of automobiles at moderate price, the volume represented by their factory outputs has a tendency to bring down the average figure.

Chicago's bill for new automobiles totals $30,925,000 and the outside sales account for an item of $9,500,000. The receipts of automobile row for new automobiles amount to about $40,425,000.

Michigan avenue from north of Twelfth street to Thirty-third street used to be called "Gasoline Row," but such an appellation cannot be justly applied to it in its present stage because there are a dozen concerns handling electrics here and there along its whole length and it has been estimated that there are at least 2,500 cars of that description in operation in the city. About one electric to seven gasoline cars is approximately the proportion to be seen on Michigan avenue all day long. Every store that handles a line of electrics reports a steady and increasing demand for that type of car.

The "Row" is about two and a half miles long, beginning with the White and Cartercar establishments and a clump of dealers bunched about Twelfth street and extending to the headquarters of the Apperson at Thirty-third street and Indiana avenue and the Moon still farther south.

The industry did much for Michigan avenue, which was formerly the residential district of the very élite, when that élite consisted of stock yard magnates, wheat emperors, real estate monarchs and railroad kings. The élite began to abandon Michigan avenue about twenty years ago and were succeeded by an elaborate system of boarding houses, which in turn became less and less elaborate as time went on.

When the vogue of the motor began lordly Michigan avenue was somewhat frayed at the elbows as far as valuations were concerned and incomes from it were precarious and small. To-day, while the "Row" is not compact like that on Broadway, it has served to vitalize and regenerate values throughout its extent of more than two miles. Millions have been spent in raising majestic sales buildings that outshine those of New York in the general average and in particular instances compare favorably with the homes of any industry anywhere. Nothing finer in the way of automobile sales establishments have been erected than those which house the Locomobile, Peerless, Packard and several others in Chicago. The Columbia and Maxwell, Detroit Electric, Chalmers, Velie, Thomas and Stoddard-Dayton all have magnificent homes and

there are a dozen more that are distinctly creditable.

Several of the sales establishments have been doing business for over ten years. The Ralph Temple Automobile Company, which now handles the Jackson and Baker Electrics, claims to be the pioneer, going back so far into ancient history that dates are somewhat shadowy. It is said that this company sold the first Oldsmobile that was made, a single-cylinder curved-dash runabout, and that the date was 1898. As nobody would undertake to deny such archæological figures, the statement stands.

If one will imagine a street almost twice as wide as Fifth avenue, smoothly paved and maintained to the minute, flat as a billiard table in its longitudinal lines, symmetrically curved to the gutters in its cross section, as straight as an arrow from end to end, he will have an idea of the geographical setting of Chicago's automobile sales district.

There is only a trace of congestion, except in that mysterious section referred to by Chicagoans as "Within the Loop." It does not rack the life out of a car to drive it the full length of Michigan avenue every day, because the street is so wide that the tremendous current of automobiles flows smoothly, and transmissions and motors, to say nothing of tires, last longer in operation on Michigan avenue than they do on Fifth avenue.

Chicago has a system of connected parks that is unique in Christendom. One may drive all day without getting away from the smooth boulevards and parkways that comprise this magnificent institution. Starting at the head of Drexel boulevard the motorist can drive south to the beginning of the lower series of big parks and by following the macadam pavement can continue for hours, circling about the big flat town under conditions that approach the automobiling ideal. He may bring up at Lincoln Park on the Northside, from which trend the Lake Shore and Sheridan Drives, leading toward the Wisconsin line.

All told there is nothing in the United States that will compare with Chicago parks and parkways as an attraction for automobile operation, and consequently everybody in the Windy City owns an automobile if he can afford it. This fact makes the selling of cars somewhat simpler in Chicago than it is elsewhere. It looks so easy and delightful to trundle along the fine broad streets and the advantages of motor travel are so apparent that the Chicago salesmen do not have to convince prospective customers of the beauties afforded by the possession of a car. In fact, the Chicago salesmen have the single, simple theorem to demonstrate, namely, that his car affords value for the money it costs.

Like New York, Chicago is an important "big car" center. The wealthy men

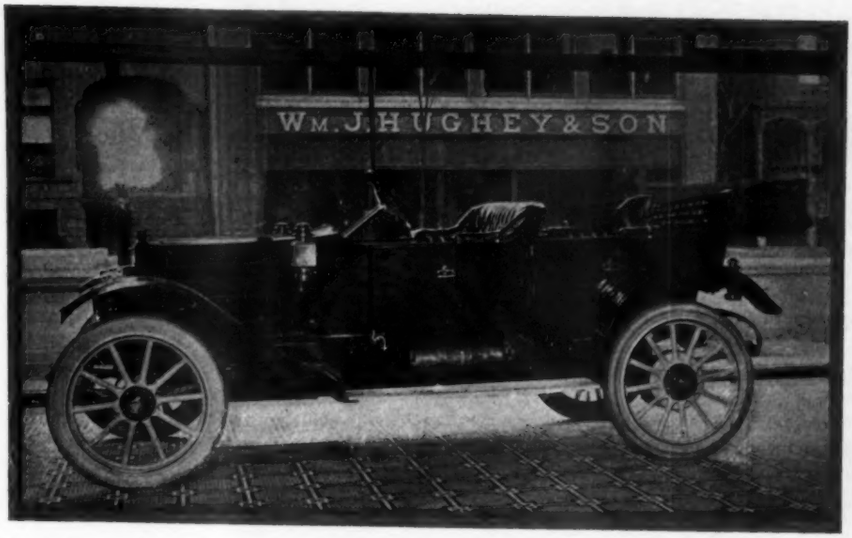


Fig. 4—Showing the last Hudson car left in Louis Geyler's salesroom, 2519 Michigan avenue, after Saturday's rush

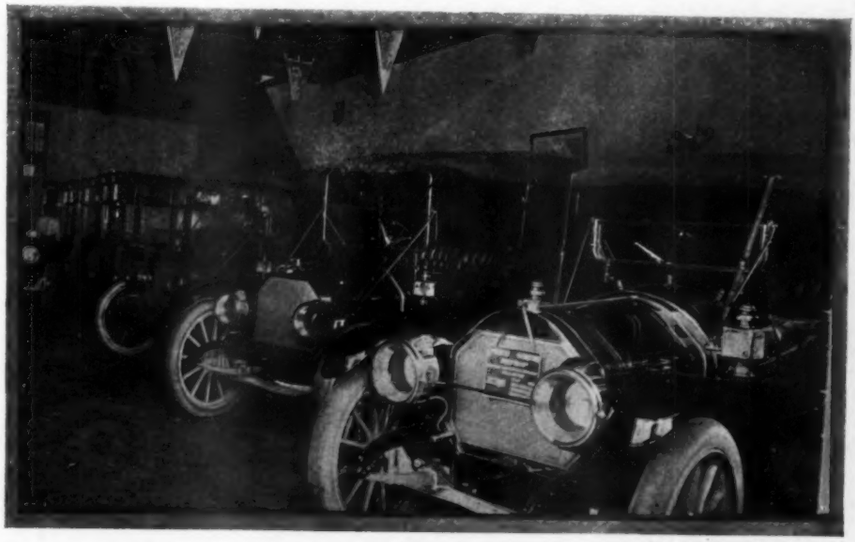


Fig. 5—Where the Overland line is displayed at 2425 Michigan avenue, by Furmer Motor Car Company

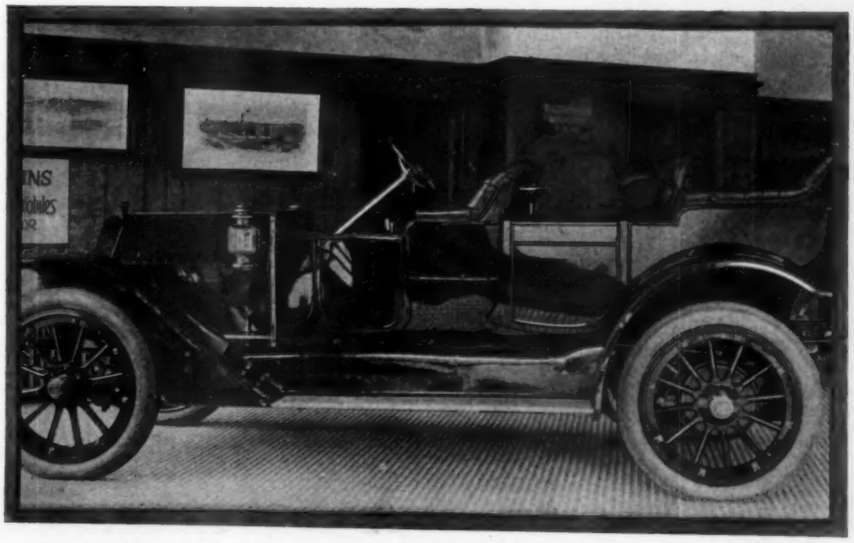


Fig. 6—United Motor Chicago Company, 1735-37 Michigan avenue, showing a Columbia car

of the city own powerful cars in large proportion. Automobiles with engines capable of developing 90 horsepower and more than a-mile-a-minute speed are common and there is scarcely a prominent family that does not possess at least one car of from 40 to 60 horsepower. But this section of the automobile public must of necessity be small as compared with the great bulk of users of the motor car. In Chicago the car of moderate price is the favorite. There are more Maxwells, Mitchells, Overlands and cars ranging from $900 to $2,000 in use, compared with the total number in operation, than anywhere else in the country. The automobiles of even lower cost are also intensely popular. The foreigners are of secondary importance in considering the Chicago sales field.

The whole situation means that Windy City motordom is different in many ways from that of New York. It contains thousands of owners who would not be ranked among the motorists of the metropolis. These are mostly salaried men whose earnings would not be considered sufficiently high to warrant owning a car in New York, but which have proved to be enough to maintain one easily in Chicago. The same condition applies to business men whose income would not stand the New York drain for tire bills and satisfy the monthly bill collections.

Chicago has sixty-five automobile salesrooms, of which fifty-five transact an annual business averaging nearly 450 cars per store. The remainder, in which are included some of the biggest and most costly cars, handle an average of 100 cars. It has been estimated that something like 600 electrics will be put out during 1911.

Business so far this year has been rather quiet all along the "Row," on account of a hard Winter and a backward March. But with the advent of April the stormy season began to give way and during the visit of the representative of THE AUTOMOBILE selling industry fairly seethed. Out in the bright Spring sunshine the salesmen were working overtime with demonstrations and stocks moved rapidly. While there is no exuberance apparent anywhere in the district, there is a feeling of confidence and a quiet optimism that invariably precedes a season of active business in any line.

Despite curtailment of manufacture in certain factories and a general trimming of financial sails, only one or two dealers would admit smaller allotments of cars for 1911 than they had in 1910. This is partially accounted for in the aggregate by the vast volume of hitherto unknown cars that has been added to the lines handled in several of the old selling companies. But the fact remains that only a few standard companies have cut down the number of cars assigned to the Chicago distributors.

Fig. 7—Cole Motor Company, at 1470 Michigan avenue, sells the Cole and Westcott

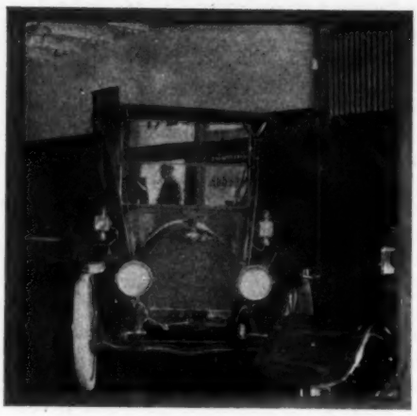


Fig. 8—Centaur Motor Company, 1725 Michigan avenue, Abbott-Detroit, Krit and Dayton electric

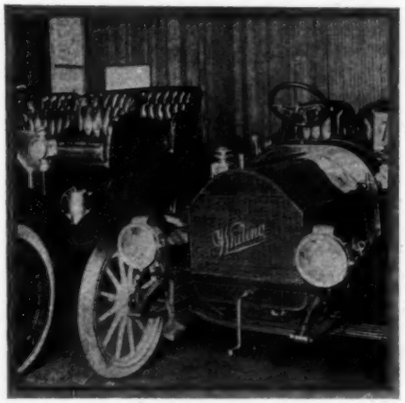


Fig. 9—Adams Automobile Company handles the Paterson and Whiting at 1420 Michigan avenue

All of which means that motordom looks for the best season by far in the history of the industry and is prepared for one that may not prove to set the record mark of sales much higher.

The improved elasticity in manufacture is in a measure the reason for the conviction in Chicago that there is going to be neither a glutted market nor a famine of cars. Assurances have been received that if the demand requires it may be possible to get more cars than the allotments called for, but that until such a demand develops, it would be better to keep slightly over on the conservative side.

As it is, even thus early in the season, some inquiries are being received for good second-hand cars, and while the day of the brass band in the automobile business has passed along, there is a measurable feeling up and down the line that the season's allotments of new cars and the used machines taken in trade will be moved before Fall.

It costs far less to operate and maintain an automobile in Chicago than it does in many other sections of the country, particularly New York City. As all auto-

Fig. 10—Showing a portion of the Chicago home of the Brush runabout and delivery car, 2328 Michigan avenue

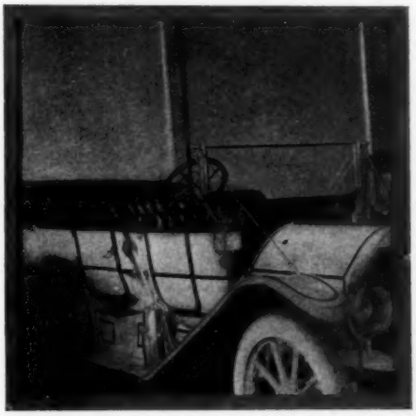


Fig. 11—The Henry Motor Car Sales Company, 1507 Michigan avenue, distributes the entire factory product

mobilists know, the chief items of expense in running a car are the tire bills, gasoline and oil, maintenance and chauffeur's wages. Taking these items in order, the facts as they obtain in Chicago are as follows:

The topography of the city is peculiarly flat and rather monotonously level. Chicago was built on a swamp, where it was not located on sand dunes. Its giant skyscrapers are founded on piles driven into a heavy bed of clay. Extending from a point eight miles down on the Indiana State line, it stretches along the shores of Lake Michigan nearly to the north line of Cook County, a matter of over fory miles. The city is densely populated for more than eight miles west of the lake shore and in the whole length and breadth of the town there is not a hill that is worthy of mention. Properly, Chicago has been termed the "Garden City," for in the course of its growth its builders provided for the most wonderful series of public parks that can be boasted by any community in the United States. Long before the advent of the automobile Chicago had a system of boulevards that formed the subject matter of that magnificent optimism that has always been so noticeable about the native of the big town. There was never any necessity for the gathering of two or three Chicagoans together to give the opportunity for a little conversation in which nothing but superlative adjectives were ever used in describing the charms of Chicago. A single Chicagoan was always sufficient to get the facts before the public. Thus, little by little the fame of Chicago was spread all over the world and the carping critics surnamed the place the "Windy City." Of course, the wind does blow in Chicago just as it does elsewhere, but Rude Boreas never had a chance in competition with the Native Son when discussing his home town.

From the viewpoint of motordom, the flatness of Chicago means that the automobile does not have to climb any hills. Thus the strain on the mechanical parts of the car caused by pulling up heavy grades is one of the things that does not have to be considered. Secondly, the boulevards are all that the most ardent Chicagoans claim for them. They are well paved and well kept and furnish as fine a groundwork for the automobile as exists anywhere. Then, too, the streets, entirely aside from the park system, are well maintained. As a general thing, the side street in Chicago is about as wide as Broadway. Things are not crowded and congested as they are in New York and some other places. Of course there are not nearly so many people in Chicago as in the metropolis and the pressure of traffic is nothing to compare with that of New York, but the fact should not be lost sight of that the Chicago streets are vastly better calculated to bear the traffic of a city of the size of New York than those of New York itself.

Grand Boulevard, Midway Plaisance, Michigan avenue, Garfield Boulevard, Lake Shore Drive and a dozen other great highways have no counterpart in the metropolis and consequently there is a delightful absence of such conditions as obtain daily on Fifth avenue. Twenty miles an hour is a rate of speed manifestly unsafe if it is not absolutely impossible on lower Broadway, but such a speed is just a nice comfortable rate in Chicago, even in the district comprised by Automobile Row.

Big cars, such as those that use up four or five sets of shoes in 8,000 miles of travel in New York, will get the same mileage or more on two sets of tires. The average tire consumption of the car in New York is two sets of shoes and twenty tubes in 8,000 miles. In Chicago that is the maximum figure for the heavy cars, while the figures for the small automobiles run down to one set and eight tubes, while the average is between five and six tires with a dozen inner tubes.

Fig. 12—Front elevation of the new building of the Louis Geyler Company, Hudson agents, 2519-2521 Michigan avenue

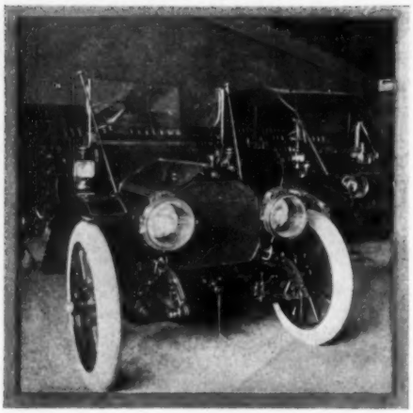


Fig. 13—Morrison Motor Car Company, 1716 Michigan avenue—Garford and Case cars

It has been estimated that there are about 30,000 cars in operation in Chicago. Thus the annual tire bill would amount to $13,500,000 or $450 per car, about one-third less than New Yorkers pay, according to the latest estimate.

This saving is solely due to the condition of the streets in Chicago and is not in anyway dependent upon the cost of the tires per piece.

In the matter of fuel and oil there is a distinct advantage to the operator of a car in Chicago as compared with his brother in New York. On a mileage of 8,000, if the rate of consumption is eight miles to the gallon of gasoline, it would require 1,000 gallons to give the required power. At the prevailing rate of 20 cents per gallon in New York, the fuel bill for the New Yorker would amount to $200 at a moderate figure, while his oil bill takes care of another $20. In Chicago the price of gasoline is 15 cents a gallon; thus $50 is saved in the matter of gasoline alone in the operation of the average car for a year.

While the service, maintenance and repair ideas in Chicago have not reached the level of excellence attained in a few instances in New York the repair situation is very well in hand in the Windy City. Every one of the sixty-five selling establishments has its maintenance department. Several of them are elaborate in the extreme and contain provisions for the swift, economical handling of any job, no matter how complicated. The service department of the Locomobile is a particularly notable instance of the provision that has been made to care for Chicago-owned automobiles. This concern has a big building 171 by 75 feet at the southwest corner of Michigan avenue and Twentieth street. Back of the salesroom there is a stock room where parts are stored for all the models turned out by that company for many years. Complete cars could be assembled out of the parts held in stock and the management asserts quite positively that it carries the fullest line in the Middle West if not in the whole country.

The second floor is occupied by a storeroom and second-hand car department and the third floor is given over to a machine shop that would compare favorably with many automobile factories. It is equipped with everything that lends itself to speed, thoroughness and efficiency of repairs.

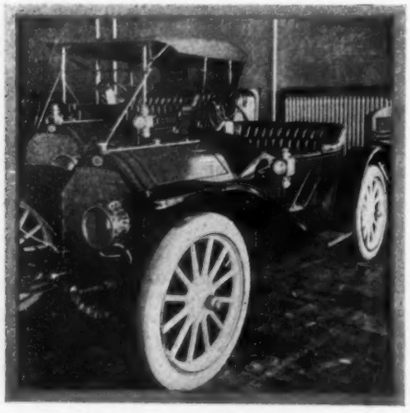


Fig. 14—Establishment of G. E. Holmes, 1502 Michigan avenue, where the Regal line is sold

There are a number of other service departments that are notably large and complete, particularly those of the Chicago, Coach & Carriage Company, Velie, Jackson, Chalmers, Studebaker, Ford and Premier. In a few of these all kinds of cars are handled, but in the main the service departments of Chicago handle only the cars that are sold in the establishments with which they are connected.

As has been said, each dealer has some sort of a repair department and where grave or basic repairs are necessary most of them have the heavy work done in independent machine shops. There are many of these along Automobile Row.

It may be the state of the labor market and it may be that the Chicagoans demand stronger guarantees from dealers than buyers do in some other sections, but the fact remains that it is only in a few of the exclusive service departments where the New York rate of 75 cents an hour is charged to customers for repair work. At most of the high-class places 60 cents an hour is about the rate charged and in some it runs as low as absolute cost. This makes a distinct difference in the amount of money needed to keep the automobile running in Chicago as against the New York item.

On an equal basis of hours, the Windy City owner gets the best of the situation by about 15 cents an hour. Take the big car average for example: In New York it is about 270 hours labor per year. That amounts to about $200. If the same number of hours were necessary in Chicago the cost would be $162. But the good pavements and easy motoring conditions in Chicago reduce in material degree the amount of repair work needed and the general average of repairs is probably not far from 200 hours each year for the high-powered cars and little or nothing for parts. In money terms this would be in the neighborhood of $125 a year. The Chicago service departments do a large amount of business and the replacements made under the manufacturers' guarantee is an appreciable item.

The last of the four factors in the cost of operation is the matter of the chauffeur's wages. The demand for chauffeurs

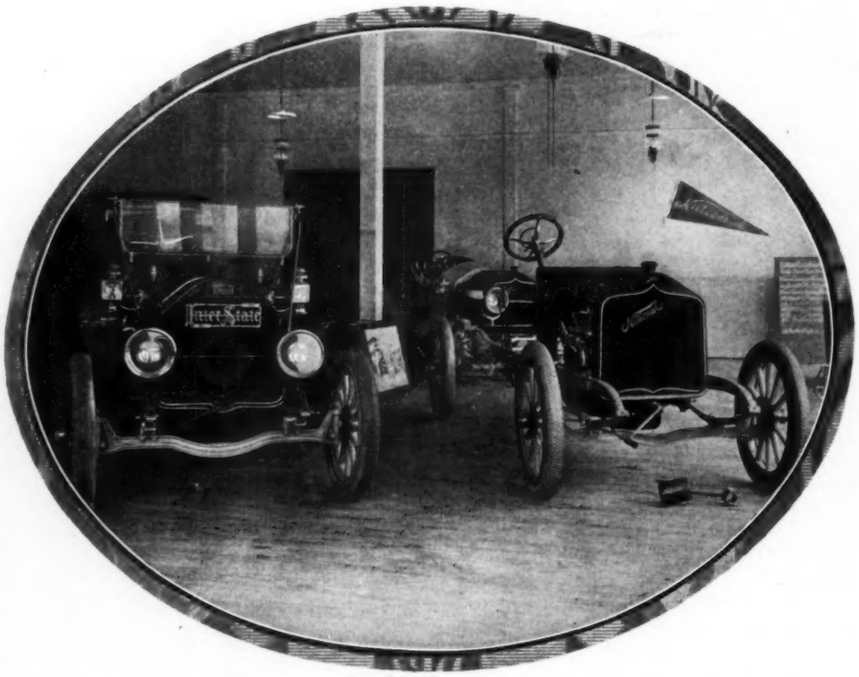


Fig. 15—Chicago home of the speedy National and sturdy Inter-State, 1354 Michigan avenue

is not so heavy in the West, as many more car owners do the driving than they do in New York. Wages on the average amount to about $1,200 a year, or less by $100 than they are in the metropolis.

Thus in the operation of a big car the Chicago owner saves the following amounts in comparison with the owner of a corresponding car in New York: On tires and tubes, $230; on gasoline and oil, $50; on repairs, $75; on chauffeur, $100; the total is $455. With the small cars as subject matter, the saving would be about $250 a year, disregarding the item of chauffeur's wages. The average saving in Chicago figures close to $300 per car per year.

If that amount was cut from the bills of New York motordom the saving in the metropolis would total $12,000,000 in one lump, all but a small portion of which may be laid at the door of the difference between New York and Chicago streets. Naturally enough the city traffic in Chicago is more trying upon tires and mechanisms than well-kept country roads would be, but the difference is sufficiently notable for practical purposes.

The saving represents from 15 to 25 per cent. of the cost of operation of small cars and alone stands for the real reason for the wider sales field in Chicago. Many a man in New York whose income is greater than that of the majority of Chicago automobile owners hesitates to buy and operate a car because of the excessive cost of the items enumerated. Thus he is deprived of the pleasure and benefits to health and the convenience of an automobile while his counterpart in Chicago enjoys all of them without stint.

The second-hand situation in Chicago is acute. Fully one-half of all the sales made in which new cars are the subject matter, old cars are taken in trade. In past years anything with four wheels and a motor was regarded as the basis of a trade for a new car and in several of the storerooms along the row there is a collection of old junk that would be deserving of honorable mention in any exhibition of antiques. Ranged in line in one of these places last week there was a Premier of the first lot turned out by the Indianapolis factory, two ancient White steamers, two equally venerable Stanley steamers, a Darracq ten years old and two decrepit Oldsmobiles of the vintage of 1900. They could have been purchased in bulk at an average price of $60, but they stood the company some $12,000 in trades. Such ruinous practices happily have been abandoned and the basis upon which second-hand cars are taken in trade in Chicago now is much more equitable.

Still there are some amusing cases reported every now and then. During the rounds of the representative of THE AUTOMOBILE a six-cylinder car of 1910 model and medium-priced stopped in front of the door of an establishment where a line that sells for $2,000 is handled. The owner was driving and when he had introduced himself to the sales manager and inspected his wares he declared that he wished to buy a car. He wanted to trade in his "six" and pay the difference in cash. The sale, however, was not made because the owner of the "six" wanted $1,800 allowance for his car.

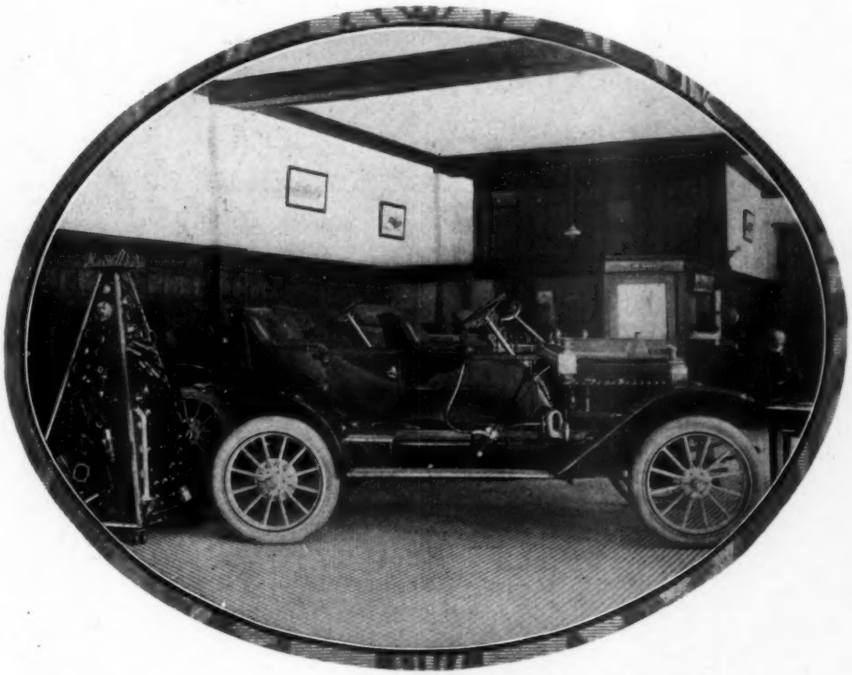


Fig. 16—Maxwell "I" car, a feature of the line of the United Motor Chicago Company

Fig. 17—B. C. Hamilton & Co., 1218 Michigan avenue, where Fal, Reo, Chadwick, Nance and Pullman are sold

Most of the agencies decline to handle the second-hand cars of other makes, preferring to specialize in their own wares. These concerns make it a point to carry full lines of parts for their own cars and this fact has a tendency to restrict the field for second-hand cars to the selling concerns from which they came in the first place. Of course some companies take anything that will run and make some sort of an allowance for it and in most of the agencies for large cars small cars of other makes find a warm welcome, but there is very small volume to the trade that depends upon turning in used cars of expensive manufacture for cars that list in the medium-priced class, unless there is a margin of cash as well.

It is simple enough to get a comfortable allowance in trade for some of the larger makes where the second-hand car is in good condition and its original list price was, say, one-third of the list price of the big car. Particularly in Chicago is there a constant market for good second-hand cars of moderate original price. The actual cash returns from such cars is better than it is in New York. Cars of the class of the Cadillac, Chalmers and Haynes are readily absorbed in the second-hand cash or trade exchange.

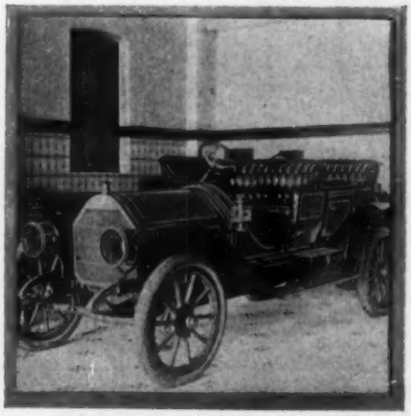


Fig. 18—Velie Motor Car Company, 1615 Michigan avenue, where an aggressive campaign is in progress

Details of the Establishments

Automobile Row in Chicago is limited strictly to frontage on Michigan avenue, with the exception of the Apperson agency, which is on Indiana avenue and Thirty-third street, just to prove the rule. Taking the north line as Twelfth street and the south line Twenty-sixth street, Michigan avenue accommodates almost all of the leading automobile factories of the United States with local sales agencies.

North of Twelfth street there are a few dealers, notably the Chicago home of the White and Cartercar, while south of Twenty-sixth street are the Pope-Hartford, Moon and one or two more.

The following list does not contain quite all the agencies between the lines indicated, but it does cover practically all the more important establishments. Adjacent to the commodious quarters of *Motor Age*, which are located at the corner of Twelfth street and Michigan avenue, is the store of B. C. Hamilton & Co. at No. 1218 Michigan avenue. This company has been in existence for three years and does a diversified business, handling three lines, the Chadwick, Pullman and Nance. The total allotment of these three varieties of automobiles foots up about 100 cars, of which the Pullman stock is sixty. In the same building, salesroom and garage is the Reo Automobile Co., handling the Reo, and the Fal Motor Car Co., distributing the Falcar.

Across the avenue at No. 1221 is the Ralph Temple Automobile Co., the pioneer of the "Row." It is stated that the history of this concern extends back thirteen years, when it undertook to sell the first Oldsmobile and the National Electric. Later this company handled the Panhard, De Dietrich, Darracq, De Dion, Premier, Reo and National cars; this year it has the Jackson and Baker Electric.

Last year the Temple company handled 600 Jacksons and this year the allotment is placed by the company at 750. The Bakers to be sold in 1911 total 100 cars. A fully equipped machine shop and repair department is maintained for both lines and a complete line of parts is carried in stock.

South from the Jackson headquarters is the Chicago Coach & Carriage Co., in whose establishment the Badger and Cutting cars are displayed. The chassis department is probably the largest in the Windy City and a feature is made of the manufacture of all kinds of motors. Max Sulecky, a progressive practical engineer, is in charge of this department as well as the service section of the company.

A few doors further south is the establishment of C. Friedberg, who sells the Schacht line and the Van runabout. Mr. Friedberg said he expected to sell 100 Schachts and half as many Vans during the 1911 selling season.

The Chicago branch of the Winton Motor Co. is the next big store on the row.

At the northwest corner of Fourteenth street is the commodious showroom and fine garage of the National Automobile Company and the Inter-State Motor Car Co., where both of those well-known makes of automobiles are handled. C. W. Caldwell, president of the concern, is one of the most successful members of the Chicago selling fraternity and under his handling the sale of Nationals has been lively. In 1910 fifty cars were distributed of that make and the allotment for this year includes 125 Nationals and 100 Inter-States. J. Harry Seek is the Inter-State representative.

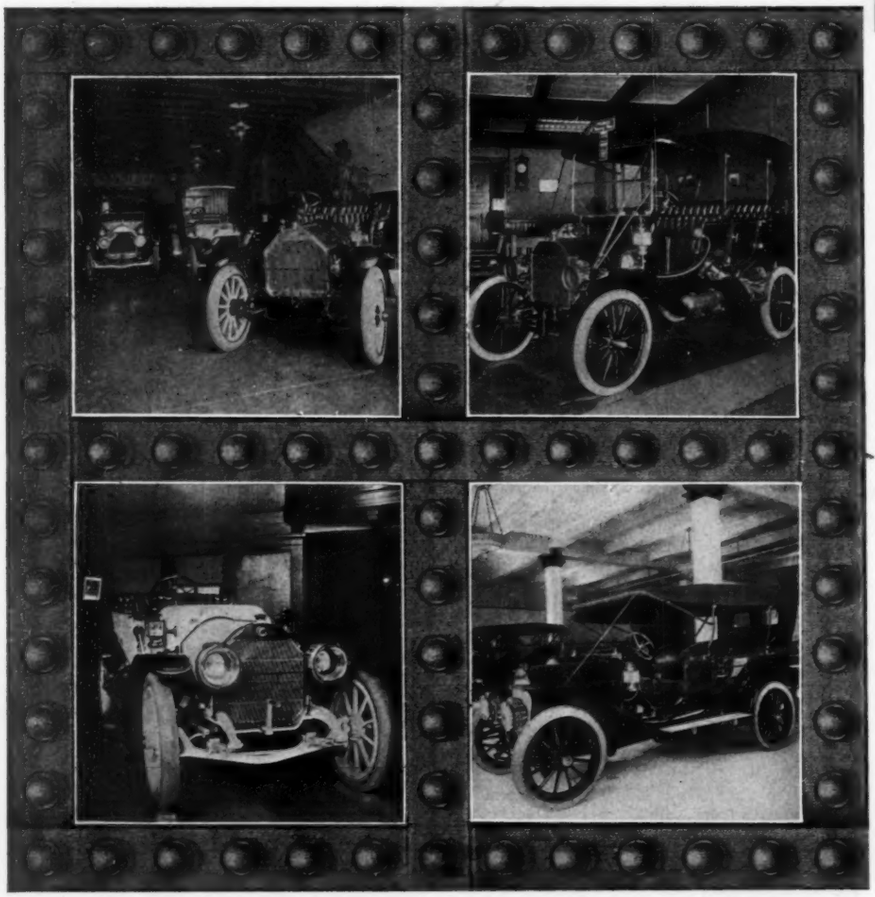


Fig. 19—Part of the salesroom of C. Friedberg, 1233 Michigan avenue, where Schacht and Van are sold

Fig. 20—Where the Premier and Moline are sold, The Quality Car Company, 2329-31 Michigan avenue

Fig. 21—Showing the Chicago home of the Ford, 1448 Michigan avenue, headquarters for a wide territory

Fig. 22—Chicago home of the Stoddard-Dayton and Rauch and Lang electric, 2457 Michigan avenue

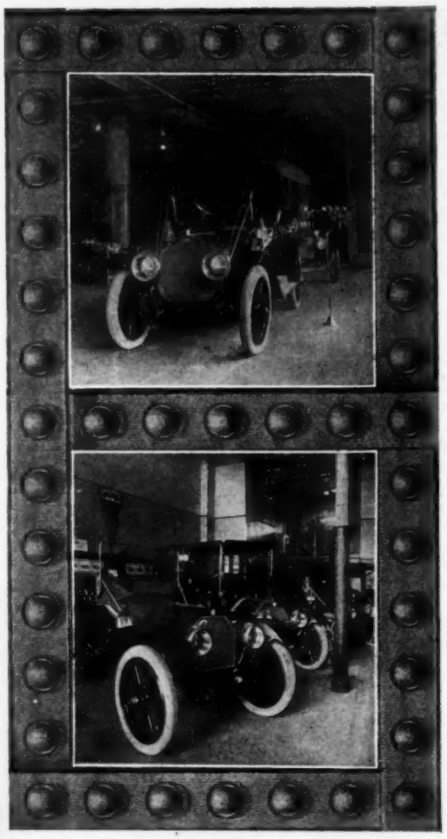


Fig. 23—Where Chicagoans buy the Studebaker, E-M-F and Flanders, 2030-36 Michigan avenue

Fig. 24—Salesroom of the Chalmers line at 1467-69 Michigan avenue, where it occupies a whole building

Along Chicago's Automobile Row

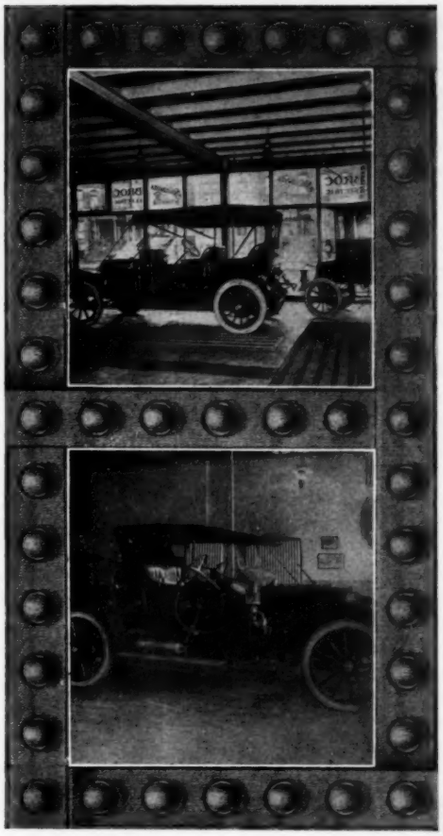


Fig. 25—Stearns and Broc electric lines are handled at 2431 Michigan avenue
Fig. 26—McFarlan Six as shown in the rooms of C. A. Coey, 1424-26 Michigan avenue

The next block south contains a number of dealers' stores, chief among which are the following:

At 1420 is the Adams Automobile Co., which handles the complete Paterson line and the Whiting runabout. The company has an allotment of 100 of each make and reports a good business.

At 1424-26 is the Charles A. Coey Automobile Service Co., which distributes the McFarlan Six. In the season of 1910 about 50 cars were handled and this year the allotment is three times as large. The Coey company makes a specialty of repair work and overhauling jobs.

The Ford Motor Co., 1444 Michigan avenue, has one of the largest wholesale and retail establishments in Chicago. The territory over which this branch house holds jurisdiction is extensive and Thos. J. Hay, manager, is authority for the statement that in 1910 something over 1,800 Fords were sold through this branch. This season the contract reads for 2,400 cars and the manager says that the only possible reason for not selling them will be the fact that the factory cannot furnish the cars.

Across the broad avenue at 1421 is the salesroom of the Halladay Motor Co., Chicago distributors of the product of the Streator Motor Car Co. This concern is making an active selling campaign and is rapidly outgrowing its present quarters. It is announced that the company is contemplating a move into larger rooms where more stock can be carried and where there will be ample facilities for a service department.

Crossing again to the west side of the avenue the Franklin Automobile Co.'s place at No. 1450 is the next large establishment. The Franklin has been handled in Chicago for five years and F. L. Thomas is at the head of the local company. About 100 cars were disposed of last year and the current allotment is estimated at 150.

The Chalmers Motor Company of Illinois, No. 1467-69, is the last important store in the east side of this block. This company has a whole building, the first floor of which is devoted to salesrooms, the second to storage and the third to machine shops. The company has been in existence for two years and besides the Chicago territory serves North Illinois and part of Iowa. In 1910 450 Chalmers cars were sold and this year the allotment is said to be 600, 100 of which are 40-horsepower machines.

Back a little way on the other side of the avenue is the Chicago salesroom of the Knox Automobile Co. This company announced that the Chicago allotment of 100 cars had been practically sold.

A few doors south from the Knox establishment is the store in which the Cole and Westcott cars are displayed. The concern is known as the Cole Motor Co. and the location is No. 1470.

The next block south from Fifteenth to Sixteenth street has only a few important stores. G. E. Holmes, who handles the Regal at 1502, has been in business for three years and his total volume of business has now reached large figures. Mr. Holmes has all of Illinois for his territory and his allotment for the whole State is 525 cars, of which 100 have been set off for his Chicago trade.

Across the avenue at No. 1505 is the Chicago store of the Lozier, the company handling it being the Lozier Sales Co. In 1910 about 35 Loziers were sold in the city and the big cars proved so successful that the allotment for 1911 has been raised to 50 cars, almost all of which have been

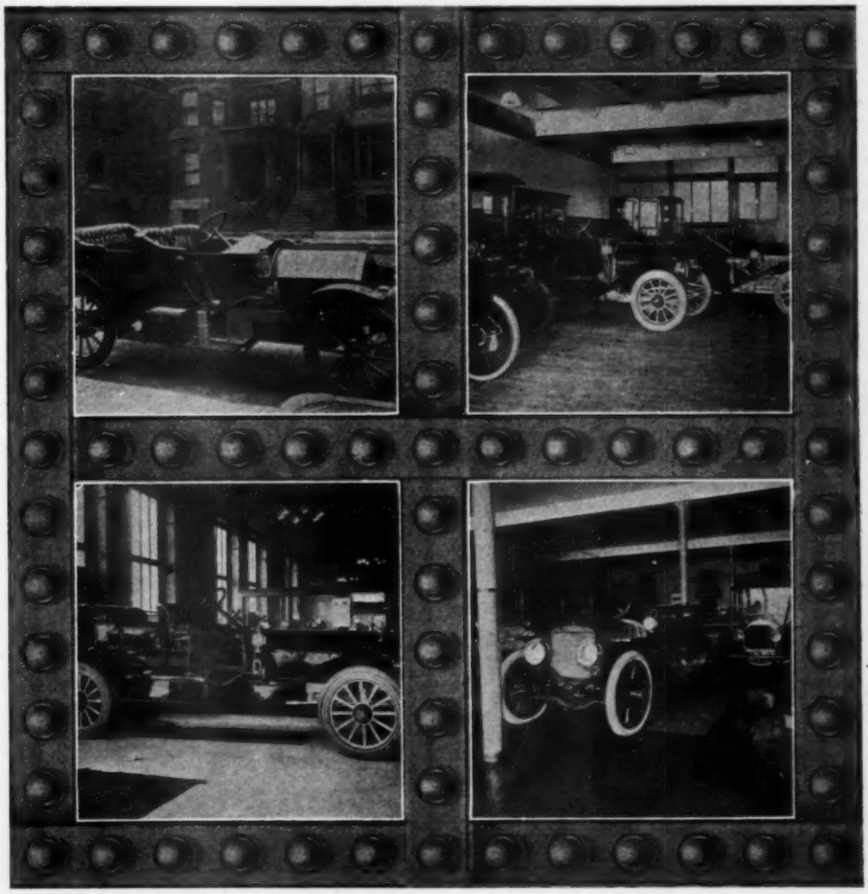


Fig. 27—Just before delivery was taken on the last car in stock at the Nyberg Automobile Works, 2437 Michigan avenue.
Fig. 28—Mitchell Automobile Company's quarters, 2334-38 Michigan avenue, where a big trade is done
Fig. 29—Ralph Temple Automobile Company, 1221 Michigan avenue, Jackson and Baker Electric
Fig. 30—Lozier Sales Company, 1503 Michigan avenue, from which this powerful car is distributed

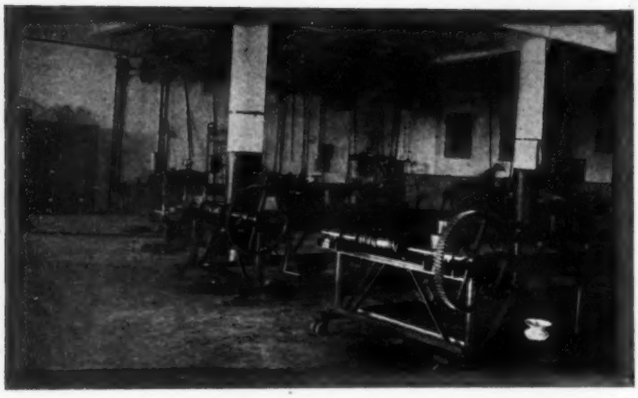


Fig. 31—Machine room of the Locomobile Company, the most complete in the Windy City

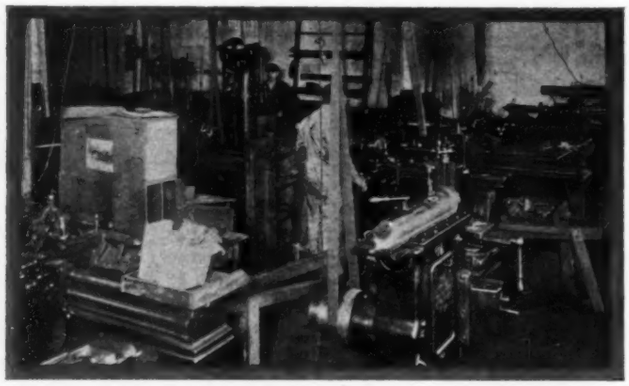


Fig. 32—Shop of the Chicago Coach and Carriage Company, where much chassis work is done

bespoken thus early in the season. This allotment is limited in distribution to the city of Chicago.

Next door to the Lozier store is the Henry Motor Car Sales Co., at No. 1507, general distributors of the factory product of the Henry plant. This concern is directed by P. H. Demange and is unlimited in its selling field. The Henry company intends to market 1,000 cars during the current selling season and has made a hopeful start locally. Last year the factory turned out 300 cars, all of which were sold through the Chicago concern.

From Sixteenth street to Seventeenth there are still fewer active selling concerns. The Haynes and Royal Tourist stores are further north and the feature establishment of the block is that of the Velie Motor Car Company, at No. 1615, which is managed by H. G. Moore. This company has an artistic and roomy sales department, an adequate storage section and a small but complete machine shop. The selling territory includes practically all of Illinois, Ohio, Indiana, Michigan and part of Wisconsin. The company intends to dispose of 400 cars during the 1911 selling season.

Just before reaching Sixteenth street lies the magnificent armory of the First Infantry, Illinois National Guard, where an important part of the annual automobile show held in Chicago under the auspices of the National Association of Automobile Manufacturers is given. The arched entrance to the armory is one of the architectural sights of the city.

Above Seventeenth street there are several lively representatives of the automobile industry. Chief among these are the establishments of the United Motor Chicago Co., 1735-37 Michigan avenue; the Centaur Motor Co., 1725 Michigan avenue, and the Morrison Motor Car Co., 1716 Michigan avenue.

The Morrison company sells the Garford and Case pleasure automobiles and Garford trucks. This year the allotment of Garford pleasure automobiles is 50 and the company will take 100 Case cars. The number of trucks has not been definitely established.

The Centaur Motor Co. has a large line of cars, including the Abbott-Detroit and Krit gasoline automobiles and the Dayton Electric.

A. M. Robbins, manager of the company, stated that he had prospects of selling 400 Abbott-Detroits, 200 Krits and as many Dayton Electrics as he is able to get. This number, however, will not be large.

The store of the United Motor Chicago Co. is one of the most complete in the Windy City. It is situated at the corner of Eighteenth street and occupies the whole of a large building. It is one of the largest distributors of automobiles in Chicago, the sales of Maxwells alone since last September totaling 1,500 cars, while 35 Columbias have been sold since November. The store is presided over by Dr. M. D. MacNab and its territory includes parts of Illinois, Indiana and Wisconsin; in fact a large part of Illinois is within its jurisdiction. For the 1911 selling season preparations are being made to exceed the total volume of business of last year by a comfortable margin, and the addition of the Sampson 35 to the line is proving specially interesting to competitors.

Between Eighteenth street and the second cross street there is a barren waste as far as automobile selling companies are concerned, but commencing with Twentieth street, Michigan avenue in the next block includes a host of active concerns.

First is the Middle Western branch of the Locomobile Company of America, the most imposing and beautiful of all the Chicago branch houses. It is located at the southwest corner, No. 2000 Michigan avenue. With a frontage of 75 feet on the boulevard and 171 feet on Nineteenth street the three-story building gives the company a fine showroom and other departments. There is nothing in the line of automobile salesrooms in New York that will compare with this one. The showroom is exceedingly high and is floored in mosaics of hard wood highly polished and giving such a reflection of light as to make photography difficult indoors. Giant fluted pillars support the ceiling and lend an air of massive impressiveness to the big room that gives the cars a perfect setting. The company disposes of one-fourth of the output of the factory at Bridgeport, Conn., and its selling territory includes all the States between Ohio and the crest of the Rocky Mountains as far south as Arkansas and Kentucky boundaries.

Fig. 33—Where the Ralph Temple Company keeps its stock of parts for the Jackson line

A. J. Banta is in charge of the concern as manager of the branch house and has supervision of all the departments included within the establishment. In addition to the sales department these comprise a very complete stock department, second-hand department, storage and repair departments. The service department employs about 50 men all the time. One minor item may be mentioned to show the care with which some of the Chicago companies strive to serve their patrons. In the Locomobile machine room there is one man and a helper who do nothing whatever but to list, classify, store and keep in repair the tools used by the others. Thus when a certain type of tool is required for a certain job the mechanic does not have to waste any time getting it, and, better still, does not have to spend a minute in sharpening it or preparing it for its use. This results in saving considerable time to customers on big and small repair work.

On the east side of the avenue is a row of stores that represent the very last word in automobile selling. Some of the competitors of the concerns housed in this row have dubbed it "The Orphanage," but that designation is hardly deserved. The building is a two-story affair and is just being completed. The first store is occupied by the Waverley Electric selling agency. Next to that store, at No. 2007, is the Chicago distributing station for the Cino, made by Haberer & Co., of Cincinnati, O. The name of the concern is the Cino Motor Car Co. and 100 cars have been contracted for this year.

There is only room to show one car in the front window of any of these stores, as the width is only 20 feet. Behind each of them is a small garage and storerooms, and while the capacity of each is small, the activity of all the establishments promises well in the selling field.

Next south of the Cino is the store of the Warren-Detroit Sales Co., which has contracted for 200 cars and has part of Illinois and Indiana in addition to the Chicago territory in which to sell them. Last year this company in another location handled 100 cars.

Next in order is the Lexington Motor Co. and the Ohio Electric Vehicle Co., handling respectively the Lexington and Ohio Electric. At 2017 Michigan avenue is the Pratt-Elkhart Motor Car Co., general distributors of this new Indiana-made car. The selling concern has 25 States for a field and expects to place 500 cars this season. Last year the company put out 130 automobiles.

R. A. Wadsworth & Co. comes next with the Oakland line. This company has parts of Illinois, Indiana and Wisconsin in its territory and has contracted for 250 cars to fill its orders.

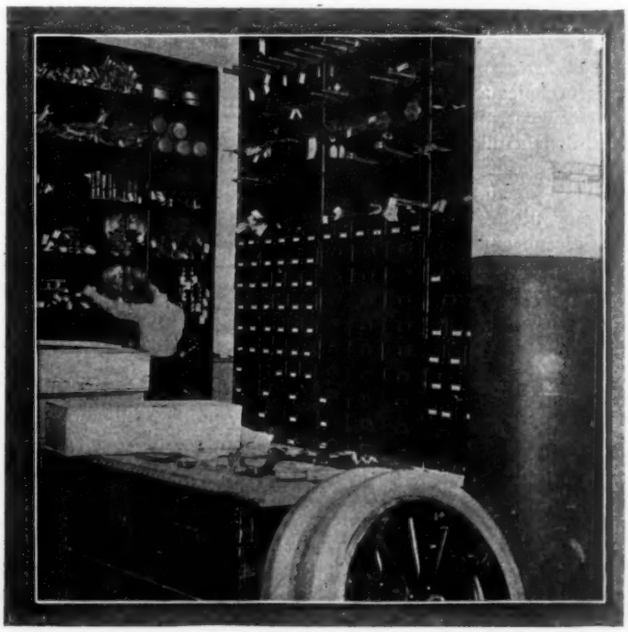


Fig. 34—The Locomobile Company's model stock room, where a fortune in parts is carried

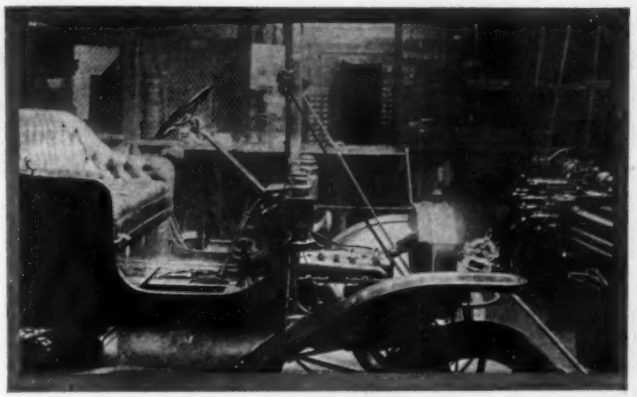


Fig. 35—Showing one corner of the repair department of the Ford Company with stockroom in background

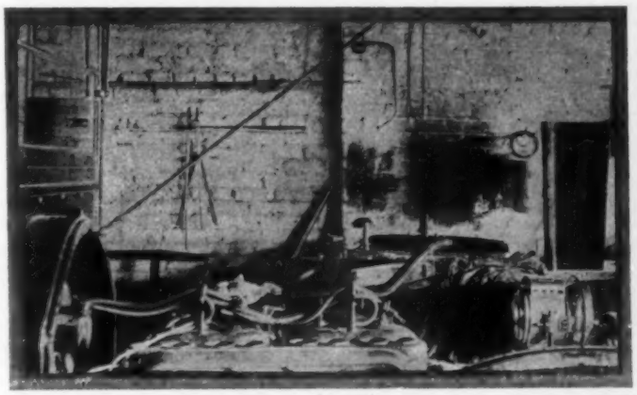


Fig. 36—A slice of the Chambers repair department, where cars are overhauled

The home of the Cunningham in Chicago adjoins that of the Oakland on the south. This car is going well in Chicago.

Fred F. Jenkins Co. finishes the row as far as automobile dealers are concerned, the other stores being occupied by accessory salesrooms. The Jenkins line consists of the Empire, for which contracts have been made for 125 cars; the Rayfield, a big new car, of which the company will try to sell about 50, and the Elkhart, as it is called in Chicago, but which is known in New York as the Crow, née Black-Crow, of which the allotment is about 50. "The Orphanage," as it is unjustly called, is one of the striking bits along the row and is typical and indicative of the spirit that pervades automobile selling in Chicago.

Crossing the street again to the corner of Twenty-first brings one to the Chicago establishment of the Studebaker Brothers Manufacturing Co., an element in the recently formed Studebaker Corporation. This company has a splendid building, an elaborate showroom, garage and service departments and is one of the show spots of the Chicago industry. Business was lively at the Studebaker establishment during the visit of the representative of THE AUTOMOBILE, there being literally one dozen interested customers on the floor at the time. The manager explained that trade had come to life in a hurry and that the particular day referred to was in reality the opening of the spring season. The company handles the Studebaker 40, of which contracts for 50 have been made; the E-M-F line, of which they expect to sell 300 cars, and the Flanders 20, for which arrangements have been made for 200 cars. The territory includes parts of Illinois, Iowa, Wisconsin and Indiana. The Chicago establishment occupies all the space represented by Nos. 2030 to 2036 Michigan avenue.

From Twenty-first to Twenty-second street there is a gap in the ranks of the automobile dealers, but just beyond the latter important thoroughfare is the store of the Bird-Sykes Co.,

Fig. 37—The Bird-Sykes Company, 2210-12 Michigan avenue, handle the Corbin and Matheson

Fig. 38—KisselKar line, 2515 Michigan avenue (the photograph was destroyed by reflection from the plate glass)

Fig. 39—The stately Thomas is sold in Chicago by the local branch house at 2255 Michigan avenue

2210-12 Michigan avenue, where the Corbin line manufactured at New Britain, Conn., and the Matheson line, made at Wilkes-Barre, Pa., are handled. The Corbins enjoy a rather extensive patronage in Chicago and a considerable number of Mathesons will be handled this year by the Chicago agency during the current season, as indications are.

At the northeast corner of Twenty-third street is the Chicago branch of the E. R. Thomas Motor Co., of Buffalo, N. Y. This line has long been a favorite in the Windy City and the local customers of the Thomas are among the leaders in many of the activities of the city's life. The building, while smaller than that of several of the selling companies, is artistic and impressive in architecture and affords a commanding position to the branch house.

Passing Twenty-third street one comes to a big bunch of important agencies and branch concerns. The first of these is the store and building of the Quality Car Co., which handles the Premier and Moline in Chicago. This company has the whole building at 2329 Michigan avenue. It is a beautiful building, although the showroom is small, affording only space enough to display four cars. It has a big garage and storeroom in the rear and above stairs and does a lively business.

Across the avenue at 2328 is the Chicago home of the Brush runabout. This selling company has been in existence for three years and serves a large outside territory with a supply of these serviceable pleasure automobiles and light delivery cars. The Brush business reaches a large annual total and the car is a favorite among all classes, numerous owners of big automobiles having one or more of the runabouts for auxiliary service. First buyers of cars also furnish a considerable element in Brush business as the experience of all selling companies is that the motorist commences with a small car and works up to a big one.

The Mitchell Automobile Co., whose store is at 2334 Michigan avenue, is another big factor in the situation. The Mitchell company has an allotment of 1,000 cars for 1911 and Manager H. P. Moyer says that he looks for a car shortage before the end of the season. The Mitchell company has been active in the selling field since 1904, when 45 cars were sold. The territory covered by this concern includes parts of Illinois, Indiana and Wisconsin. In addition to salesroom and selling equipment the company has a large machine shop, garage and storage facilities. The Mitchell company handles the second-hand car situation by adhering to the rule of not taking anything but Mitchells in exchange for new cars.

At the corner of Twenty-fourth street, No. 2355-57 Michigan avenue, is the Chicago Motor Car Co., distributers of the Packard in Chicago, northern Illinois and part of Indiana. This concern occupies a building that is ranked among the most beautiful and efficient along the row. It is massive in its construction and delightfully artistic in its conception as a salesroom and service department. The windows on Michigan avenue and Twenty-fourth street are among the largest in Chicago and the interior fittings are superb. The Packard has a big clientèle in Chicago and the only trouble of which the management complains is shortage of car supply.. In order to obtain the splendid picture that was taken in the quarters of the Chicago Motor Car Co. it was necessary to remove the only car in stock, a rebuilt model of 1908, and replace it with the car shown which belongs to a customer.

South from Twenty-fourth street there are a myriad of dealers and agencies. Paulman & Co., who handle the Pierce-Arrow line, are located at 2420 Michigan avenue. This company does an exclusive business with the wealthiest section of Chicago's populace and is constantly ahead of its available supply. It has a complete service department at the command of its customers.

The Detroit Electric, next to the Pierce-Arrow, has one of the most beautiful small establishments on the "Row." Press of trade was so heavy during the visit of the representative of THE AUTOMOBILE that a photograph of this store could not be obtained.

The Cadillac store in the same locality is a popular place for

buyers and across the street at 2425 are the quarters of the Furmer Motor Car Co. This concern has been doing business since 1909, when it sold nine cars to the Chicago public. This year Mr. Furmer asserts the Overland contract is for 700 automobiles. He is a great believer in the efficiency of THE AUTOMOBILE as a means of reaching the public and he says that he has distributed over 10,000 copies of the elaborate advertisement of the Overland that appeared in this publication some time ago. The Furmer company has five counties in Illinois in addition to the city as a selling field.

At 2441-45 Michigan avenue is the Western Motor Car Co., handling the Stearns and the Broc Electric. Chicago takes about 100 Stearns cars a year and the Broc line has been added to supply the big local demand for all kinds of electric cars.

The McDuffee Automobile Co., Twenty-fifth and Michigan avenue, is headquarters for the sale of Stoddard-Daytons and the Rauch & Lang electric. This company plans to sell 450 of the gasoline cars in its line this season, and announces that a considerable portion of the allotment is already disposed of. The electrics are also going freely.

The Peerless branch house at 2500 Michigan avenue ranks in appearance with any selling concern on the "Row," or, in fact, anywhere else. It has an immense building with a showroom that rivals that of the Locomobile company in richness and general impressiveness. Like the Peerless customers elsewhere the patronage of this concern includes many of the wealthy people of the city. The territory held by this branch includes parts of Indiana, Michigan, Wisconsin, Iowa, Minnesota and Illinois. Its allotment is 200 cars. According to the management the Peerless line will consist of three "sixes," two "fours" and three trucks.

The Stevens-Duryea branch is above Twenty-fifth street, this line having been taken over by the factory rather recently. It was formerly handled by Louis Geyler Co., at 2519-21 Michigan Ave.

The Geyler Company now sells the Hudson line, and is enjoying a lively trade, as is shown by the fact that 78 cars out of the allotment of 350 had been sold and delivered up to the time of the visit of THE AUTOMOBILE. There were orders on the books of the company for nearly as many more and insistent hurry orders had been sent to the factory for more cars.

The Kissel Motor Co., of Chicago, marketing the Kissel-Kar, is located at 2515 Michigan avenue, and has a contract for 300 automobiles for this season.

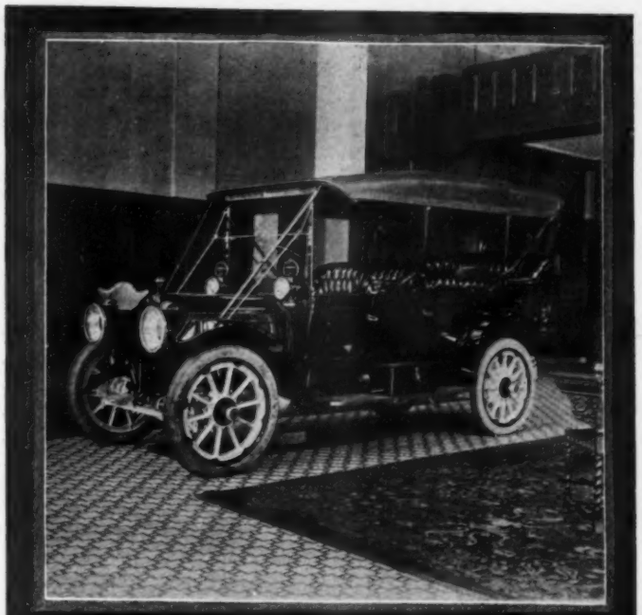
The Nyberg Automobile Works, which recently purchased the plant of the Rider-Lewis Co., is the general sales company of the factory. H. W. Williams, manager, declares that several thousand cars will be manufactured this year, and will be marketed from Chicago headquarters, which are No. 2437-39 Michigan avenue. In 1909 the Nyberg company made and sold 300 cars and in 1910 its production was 600. This year the figure estimated by the manager was 5,000 cars. The company does an extensive trading business, over one-half of the sales being made on an exchange basis. Mr. Williams says that there is a distinct inquiry for used cars.

The Pope-Hartford agency is the last one in this group, and between it and the next salesroom there is a long stretch of boulevard. As has been noted, the limits of the "Row" are occupied by the Apperson, which is just off the boulevard and the Moon near Thirty-ninth street.

Millions to Improve Pennsylvania Roads

HARRISBURG, PA., April 17—The Senate passed the Sproul Highway bill carrying an appropriation for $6,000,000 of which $4,000,000 will be used by the Highway Department, and the rest applied to State road construction and repairs. The bill also provides the laying out of 3,000 new routes.

The joint resolution proposing a $50,000,000 bond issue for improving the roads of this State has passed the Senate, being now before the House to be finally authorized.



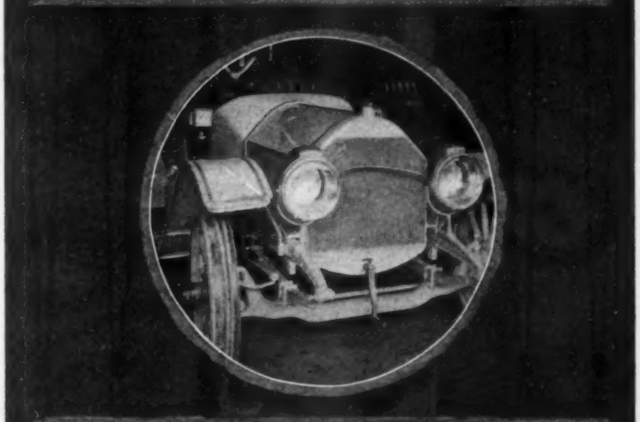


Fig. 40—Chicago home of the Packard, the Chicago Motor Car Company, 2357 Michigan avenue

Fig. 41—The Halladay Motor Car Company, 1421 Michigan avenue, handles the Halladay

Fig. 42—Chicago sales department of the Franklin Automobile Company, 1450 Michigan avenue

When Judgment Whispers Don't

Epigrammatic Presentation of Things to Remember

Considering the fact that a long story is nothing more nor less than a series of short stories, and that a short story is in its most simple form when it is reduced to a single paragraph, it remains to observe that the quality of the short story is inversely proportional to the number of words employed, with the ultimate conclusion that epigrammatic brevity is the process that must be employed to obtain the highest result.

DON'T snatch at the first automobile that is offered to you when you go forth to purchase; it is more to the point to examine all of them, and take the one that checks up with your needs.

DON'T make an excursion to the oil man after the crankshaft tells you that the bearings are melted out.

DON'T exploit your ossified ideas in your latest model, and instruct your publicity man to rave with enthusiasm.

DON'T manifest too much concern about the quality of your neighbor's automobile; if you want to ride in a tonneau, get one of your own.

DON'T inflict your exalted inspirations upon the agent from whom you hope to get a good automobile; he may not be selling that kind.

DON'T ask the repairman to crystallize your dreams when you take your car to him to have it fixed; the bill will be high enough if you permit him to do the necessary work.

DON'T display your generous compassion at the cost of a nickel to you when you approach a beggar on the street, and make a terrible noise when you get your car repaired if the cost of the work is as much as 10 cents.

DON'T make a religion out of driving an automobile the worst way to the detriment of the car, and the annoyance of others who may have a right to be on the highway.

DON'T expose your ignorance to the repairman with your car; he will capitalize it for all it is worth.

DON'T try to do so much with the hands that you are liable to forget that the Creator gave you a head.

DON'T guy the farmer who says that good ground, the best breed and the best feed will produce the crop that pays—automobiles are in the same category.

DON'T misdirect energy; you will be in the predicament of the men who live in New York and go to Washington to tell 'em how to build good roads.

DON'T fight fire without first splitting it into wings, then fight each wing separately.

DON'T fail to observe that the world is full of a number of things—some of them are gleefully sporting a disguise.

DON'T empty your wallet in the consolidation of your happiness with a decrepit second-hand automobile.

DON'T capitulate before the magic word "imported"; the device might not be any worse were it made in America.

DON'T lay in a store of liking for what are known as "potent phrases"; a spade is a spade.

DON'T be of the tribe that follows the lead; follow the bent of sense and discrimination instead.

DON'T go in for grotesque colors for your automobile—art is tame.

DON'T despair because there seemed to be so many big men in the long ago; they had very little competition; luster is a comparative condition.

DON'T try to stave off the steady upward swing of scientific principles—fall into line.

DON'T talk about what you have done; speak about what you are going to do.

DON'T look for progress through the haze of the past; it is like the rising sun and casts its dazzle upon its worshipers.

DON'T irrigate a patch of weeds; turn the water on some kind of a plant that will bear fruit.

DON'T look for conclusive evidence of all the cardinal virtues in a second-hand automobile.

DON'T exact extras from the agent when you go after a new car; he might find it necessary to make up.

DON'T be exasperated if the automobile that you examine for your possible use does not check up with your idea—ideas are generally five years old.

DON'T invest in an overgrown multi-colored automobile and then have your raiment made to match and go forth to conquer the world—success is a silent instrument in neutral tint.

DON'T belittle yourself as you do when you tell the agent that you think his make of car is a poor contrivance which you are trying to buy; what do you want of a thing that is no good?

Varnish Cracks and Spots

Old age is not the only cause of these defects; hurried methods of painting and finishing are equally potent in producing blemishes on the polished surfaces of an automobile body. Plain, ordinary city mud and careless washing help along the bad work.

CRACKING of body varnish is usually due to old age, at which stage of life all varnish is destined to check and fissure and eventually lose its capacity for preserving and beautifying the surface. Premature cracking is sometimes due to hurried methods of painting and finishing, by which method one coat of paint or color, or even varnish, is applied over a coat of material not thoroughly dry. This soft, porous and undried coat generates a gas when confined under another coat, with the result that the gas forces an outlet by cracking the surface. The cure for this latter form of surface disruption is chiefly within the hands and under the control of the painter. The fissuring of the surface incident to old age, on the contrary, depends upon the care and preserving processes practiced by the automobile users and chauffeurs. Water cleanses and cools varnish, strengthens it and, in its early days of wear upon the surface, increases its brilliancy and enriches its appearance. Do not wash the surface in the sun nor permit it to dry in the sun. Neither wash it in a freezing atmosphere.

Spotting of varnish—depriving the surface in spots of its luster—is a bad form of surface blemish which the automobile owner and user who admires the beauty and brilliancy of his machine needs to guard against. Spotting generally occurs during the early life of varnish—before it becomes old, and harsh, and brittle, and devoid of elasticity. It is due chiefly to the accumulations of mud drying upon the surface and thus through the power of capillary attraction extracting the oil from the varnish. This action in many cases not only extracts the oil but the gum constituent as well. City mud and, of course, the mud of lime districts, the former being strongly charged with ammonia, are notoriously destructive to varnish luster.

New "Six" Features 1912 Packard Line

Standard Models—"30" and "18"—Continued

The one great feature of interest in the announcement of the plans of the Packard Motor Car Company for the year 1912 is the putting on the market of a six-cylinder model. This car is designed to round out the company's line, Models 30 and 18, which have met with pronounced success in the past, being continued. The new "Six" mechanically is in many respects a replica of the well-proved excellencies of design to be found in the company's four-cylinder cars.

PARTICULAR interest is attached to the announcement of the advent of the 1912 line of Packard cars, that company, whose factory is located at Detroit, Mich., being the first to step into the arena with its bid for the patronage of the American automobile-buying public. Additional force is given the announcement by the news that the company's well-established "Thirty" and "Eighteen" have been reinforced by the coming of the Packard "Six." To this, the latest example of the company's handiwork, the greatest interest of the motorwise is naturally attracted, although the new model is primarily designed to fill out the line.

Following along the general lines of the "Thirty" and the "Eighteen," the new "Six" chassis design is composed of two units, the motor unit comprising the motor and clutch, and the rear axle unit comprising the transmission, final drive and differential gears. The motor, which is rated at 48 horsepower, according to the A. L. A. M. formula, has six vertical, water-cooled cylinders, with a bore of 4 1-2 inches and a stroke of 5 1-2 inches.

Integral waterjackets and valve chambers feature the cylinders, which are cast in pairs and are ground and interchangeable, as are the pistons, which are also fitted with ground rings—the cylinders, pistons and rings being lapped in the final assembling process.

The crankshaft runs in four large main bearings, supported by rigid caps bolted to the upper section of the crankcase. The connecting rods are drop-forged. Carefully ground bearing surfaces and fitted bushings insure quiet running. The positively lubricated camshafts, magneto and water pump gears are well protected from the dirt and dust of the road, being contained in an integrally cast forward extension of the crankcase. The latter, which is cast of special aluminum alloy, is in two horizontal sections, the uppermost of which, supported by the main frame, forms the engine base. The rear clutch shaft, clutch shifter and clutch pedal bearings are supported by an integrally cast rearward extension of the upper section of the crankcase. The crankshaft bearings are held rigidly to the uppermost crankcase section by removable caps. The lower section is an oil well, on the bottom of which are carried the oil pump and strainer. This section may be easily removed for inspection or adjustment of the connecting rods, camshafts, etc., without disturbing the crankshaft bearings.

The water circulation is positive through the cellular radiator and thence to the cylinder waterjackets, the centrifugal pump which forces the water through the system being mounted on the right side of the motor and driven by enclosed gears. The water-circulation system has a capacity of six gallons, and cleanliness of the water is insured by placing on the pump a suction strainer which may be easily removed for cleaning without breaking any of the connections. The belt-driven, ball-bearing fan has adjustments for taking up play in the belt, and the filler cap on the radiator tank is of the non-leaking type.

The lubrication system is of the positive type, the pump being driven by a worm gear on the inlet camshaft. The cylinder walls, camshafts and other parts of the motor are oiled by spray from the connecting rod bearings. Clean oil is assured by the use of a series of sediment pockets and wire mesh strainers, these pockets being provided with drain plugs in front and rear of the strainer. The pumps and strainers are easily removable for cleaning and inspection. The transmission, differential and forward universal joint run in oil, the rear universal joint being encased and packed with grease. All other running and wearing parts are provided with grease cups or oil holes. The normal oil capacity of the crankcase is one gallon, the supplementary supply being contained in a copper tank of similar capacity mounted to the left of the cylinders.

Ignition is done by the Bosch dual high-tension magneto system, mounted on the left side of the motor bed with an enclosed gear drive. A storage battery is used for starting and as a reserve, the battery being installed in a box on the running board. The transformer coil for the magneto is on the armature, that for the battery current, which is closed by a switch, being installed on the dash; the button used for starting on the switch has a bayonet lock, giving the option of single spark or vibrator spark when running on battery. The magneto and battery circuit interrupters are both operated by the armature shaft. The low-tension wiring used from the battery to the coil is carried through a protecting tube, while the high-tension wiring from the magneto distributor to the universally jointed knife switches at the spark plugs is also thoroughly protected and specially insulated.

The carbureter, of Packard design and manufacture, has a waterjacketed cylindrical mixing chamber with a butterfly throttle above the aspirating nozzle, and combines float feed and automatic mixture regulation for all motor speeds. Heated air drawn from around the outside of the exhaust header through the primary air intake on the left side of the motor assists in preventing condensation in the long inlet header. The auxiliary air inlet is automatically regulated for varying speeds by a spring-controlled poppet valve, a small lever on the dash governing the spring tension to conform with varying atmospheric conditions. An adjustable cold-air gate in the primary intake permits of the use of a greater volume of heated air in cold weather. The fuel is contained in a 21-gallon tank located under the front seat, whence it flows to the carbureter by gravity; the 5-gallon reserve supply is contained within the main tank, a three-way valve controlling the main supply, reserve and shutoff. (In runabouts, phaetons and close-coupled cars the gasoline is fed by pressure, there being an automatic pump on the engine, with an auxiliary hand pump in case of emergency.)

The regulation of the motor speed is by means of a lever on the steering wheel and by pedal, both acting directly on the throttle; the pedal provides means of instantaneous acceleration as well as continued high-speed running. A hydraulic governor, which is incorporated in the water circulation system and is a part of the pump unit, steadies the motor while running and compensates for varying loads within the limits of volitional throttle setting. The small lever on the steering wheel enables the driver to advance or retard the spark for most effective ignition under the varying running conditions as they arise. A relief handle, located near the starting crank, reduces the com-

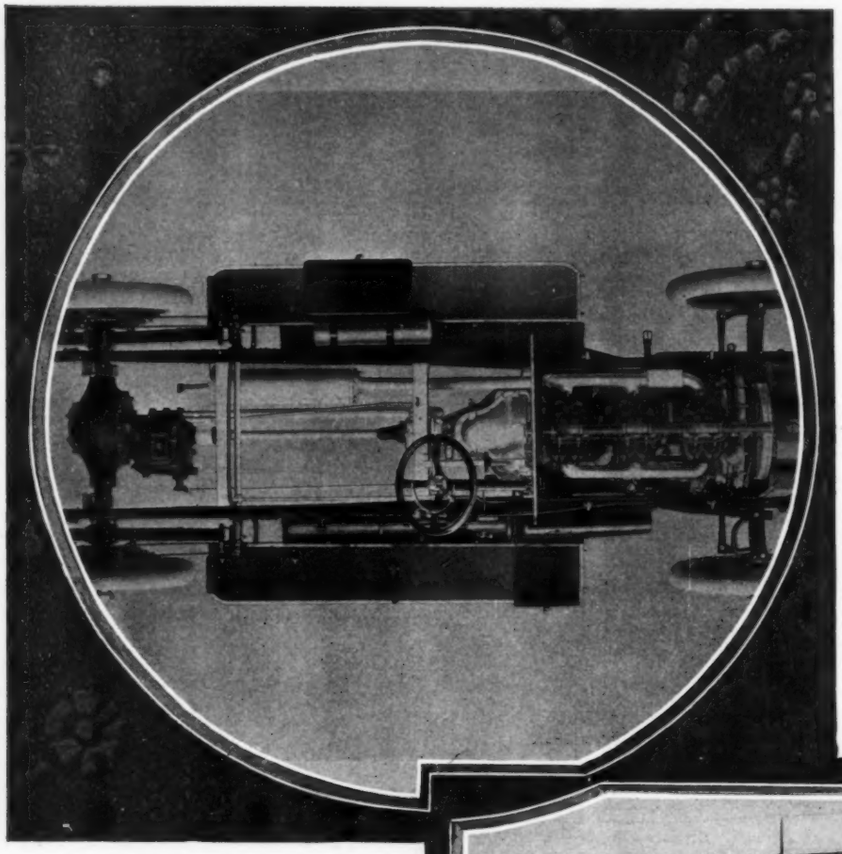


Fig. 1—1912 Packard "Six" standard chassis, plan view

pression in the event of trouble from that source in cranking.

The clutch is completely enclosed by an integral extension of the crankcase, which also supports the rear bearings. It is of the dry-plate type, the shaft plates being of metal and the casing plates being faced with special friction material. The clutch may be inspected or removed without disturbing the motor or the universal joints. The latter, at either end of a long driving shaft of minimum angularity, are snugly encased. The speed-changing, final drive and differential gears are housed in a rigid rear axle unit, none of the transmission elements being on the main frame and no intermediate parts requiring alignment between power and transmission units. This housing is of aluminum, internally ribbed to provide the necessary strength and rigidity, and is provided with oil plugs and inspection holes. The differential gear unit is supported by its own bearings, the rear axle sections being removable without disturbing the gears. The rear axle and final drive and differential gears all run on annular ball bearings.

Three forward speeds and reverse are provided, the third speed forward being on direct drive; the lever moves forward and backward for forward speeds, and laterally into a notch for the reverse, the latter movement being locked by a thumb latch. The engagement of the gears is correctly determined and assisted by spring locks on the shifter shaft. The gear-shifting toggles and other actuating parts are all snugly housed and protected from dirt and dust.

The front axle and the stationary sleeves of the rear axle are of large-diameter steel tubing of heavy gauge, the rear axle tubes being pressed into and riveted within flanged collars bolted to the aluminum rear axle housing.

The braking system is adequate—the four brakes all acting directly on the rear wheel brake drums. The service brakes are of the external contracting type, operated by a pedal, the emergency brakes being in internal expanding segments, operated by a hand lever. The internal brakes are enclosed and protected by drum disks, being provided with bayonet locks to prevent rattling.

The chassis side bars are of channel section pressed steel, arched above the rear axle to allow a liberal degree of spring action in connection with a low-hung body. Four wide, semi-elliptic springs are placed to minimize the effect

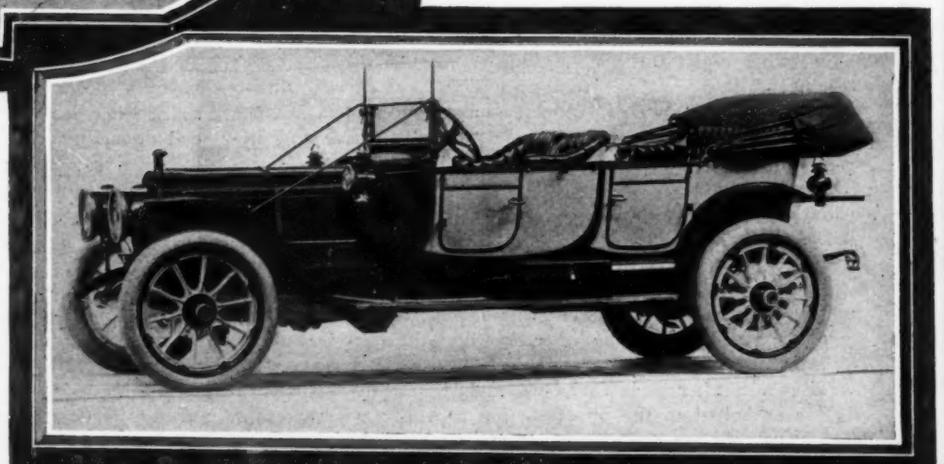


Fig. 2—1912 "Six" phaeton with standard finish and equipment

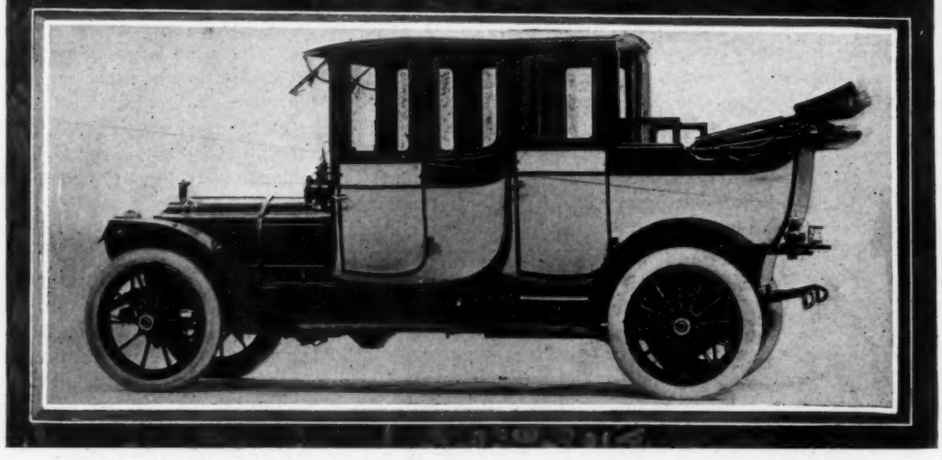


Fig. 3—1912 "Six" Imperial landaulet in standard finish and equipment

of road inequalities, those on the front being 40 inches long, the rear pair measuring 56 inches; shock absorbers on both front and rear axles assist to this end. Around the rear axle are placed limit straps, while a set of secondary springs is installed under the rear springs. Lubrication of spring shackle bearings is provided for by means of compression grease cups.

A worm-and-sector gear, the worm and sector being forged integrally with their respective shafts, insures positive steering. The large hand wheel is entirely wood covered, including the spokes near the rim, which makes for comfort in driving, the position of the steering connecting rod above the front axle tending likewise to minimize the transmission of vibration to the driver's hands. The jaw type yokes on the front axle are of heavy drop-forged material, as are the steering knuckle spindles, the knuckles being provided with ball thrust bearings. Steering connection ball joints are encased to protect them from the ingress of mud and dust, and all steering gear bearings and connections are directly lubricated through the medium of grease cups.

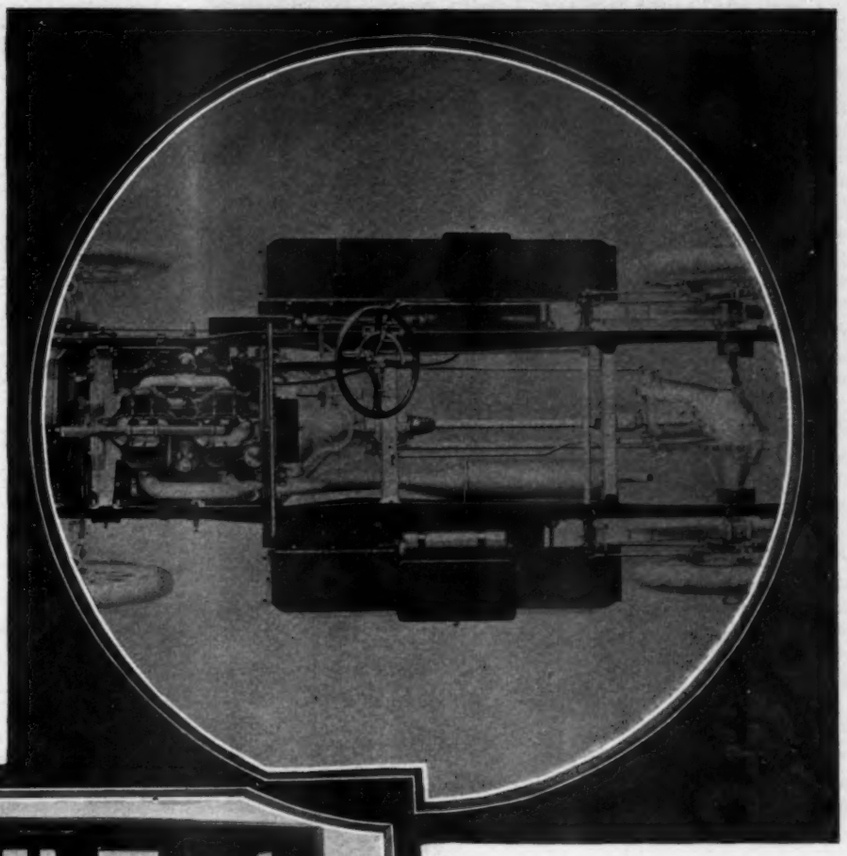


Fig. 6—1912 "30" chassis in priming coat and standard equipment

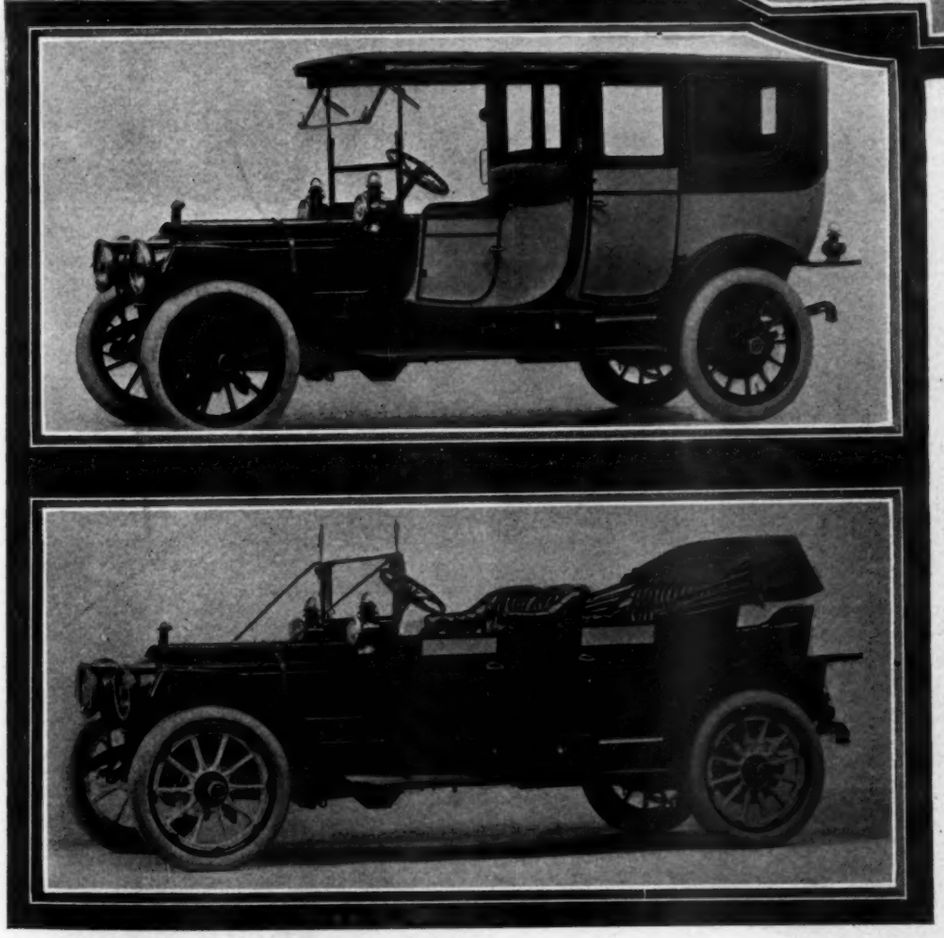


Fig. 4—1912 "Six" limousine in standard finish and equipment.

Fig. 5—1912 "Six" with close-coupled body in standard finish and equipment

The Packard "Six" wheelbase varies with the type of body designed to be used, that of the standard or close-coupled chassis measuring 133 inches; phaeton chassis, 139 inches, and the runabout chassis, 121 1-2 inches. The tread is standard throughout—56 1-2 inches.

Wheels are of the artillery type, with spokes of well-seasoned hickory. The tire equipment includes clinchers of any of the several standard makes—36 by 4 1-2 inches front, and 37 by 5 inches rear—with Continental quick detachable demountable rims.

Body options on the 1912 Packard "Six" are sufficiently diversified to afford the buyer ample choice. The touring car may be had in three styles, with extension cape cart, leather victoria or full-glass canopy top; the phaeton or close-coupled car, with extension cape cart or leather victoria top; the limousine and the imperial limousine; the landaulet and imperial landaulet; brougham; runabout and coupé.

Packard body construction is of sheet aluminum panels over wood framework. Bonnet and fenders are also of aluminum, in the latter case flanged in order to secure rigidity. Splash aprons are fitted between the front fenders and the body of the car and also between the frame and the running boards, while the rear fenders

are so attached to the body as to be practically watertight.

Standard color schemes characterize the "Six"—in the open cars the body and door panels are in blue striped with gray; underbody, body front, bonnet, radiator, frame, fenders, splashers, Prest-O-Lite tank cover, battery and tool boxes, etc., in black; wheels, axles, springs and other running gear below the frame, black striped with gray. The trimming of the open cars consists of seats of black hand-buffed straight-grain leather, tufted; running boards and front floor and heel boards covered with cork carpet, with fiber matting in the tonneau. In the closed cars the same quality of trimming obtains in the front part section, the rear compartment being covered from roof to seatboard with blue broadcloth, with blue goatskin optional below; the floor is covered with blue carpet to match. Special painting and trimming are provided in some cases at no extra charge, and in others at a slight advance. All enclosed bodies are equipped with dome lights and switches, and toilet cases to match the upholstery.

From the price standpoint the 1912 Packard "Six" proposition is particularly comprehensive, offering a range of choice on the same chassis that gives the buyer ample scope in making a selection. The touring car is standard finish and equipment, with extension cape top, is listed at $5,000; with leather victoria top, at $5,250; with full glass canopy top, at $5,445. The phaeton or close-coupled car, with cape cart top, $5,000; with leather victoria top, $5,215. The limousine and the imperial limousine are quoted at $6,250 and $6,450 respectively, while the landaulet and the imperial landaulet are listed at $6,350 and $6,550 respectively. The brougham is catalogued at $6,300; the coupé at $5,700, and the runabout at $5,000.

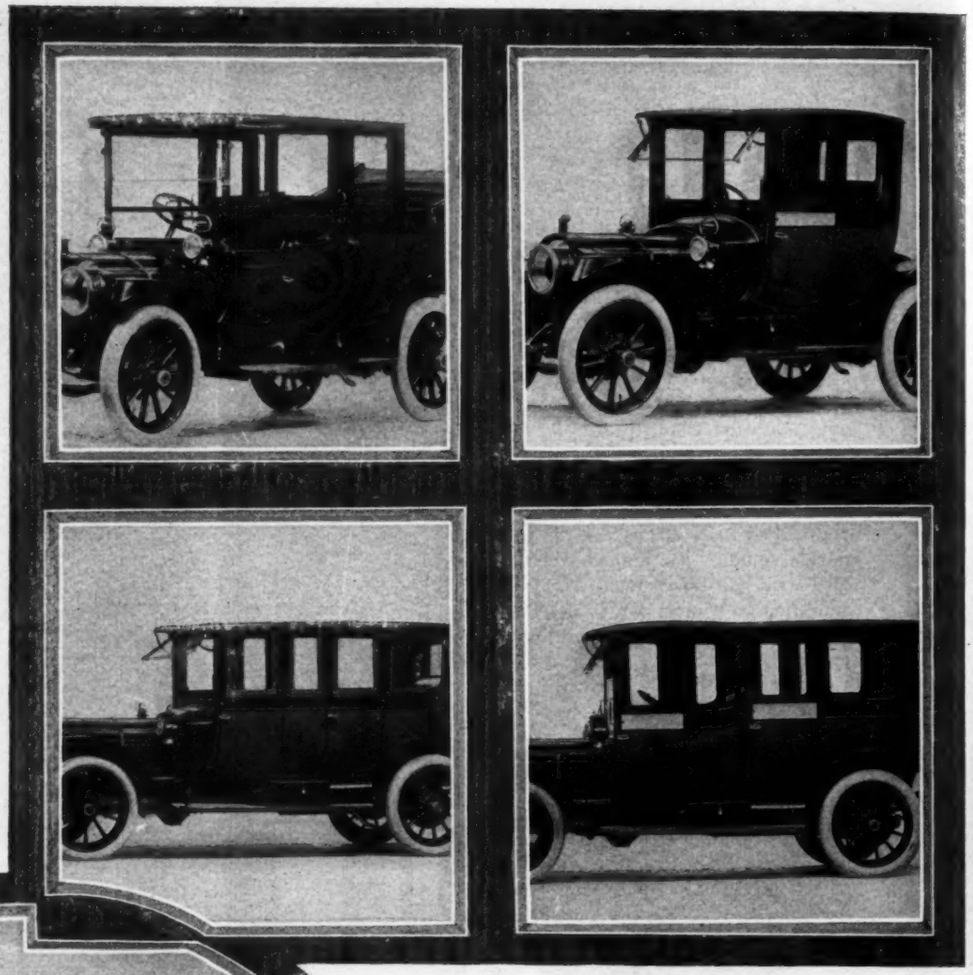


Fig. 8—1912 "30" landaulet in standard finish and equipment
Fig. 9—1912 "30" brougham in standard finish and equipment
Fig. 10—1912 "30" coupé in standard finish and equipment
Fig. 11—1912 "30" Imperial limousine in standard finish and equipment

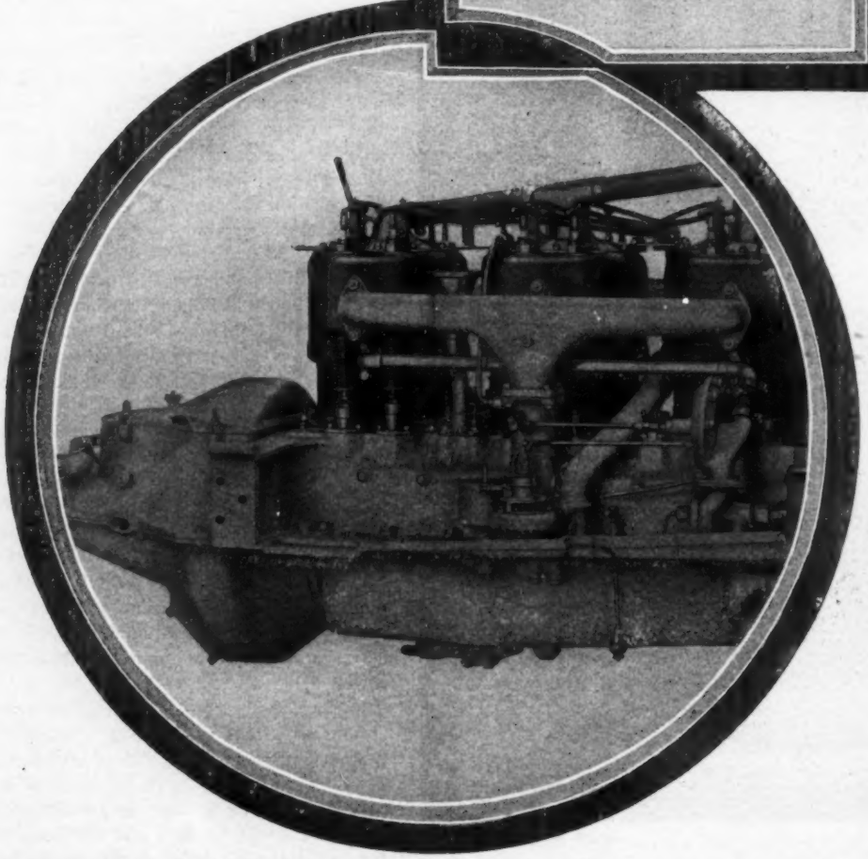


Fig. 7—1912 "Six" cylinder motor, looking at the intake side, rated at 48-horsepower A.L.A.M.

The "Thirty" Will Still Continue as the Standard Packard Car, with the "Eighteen" to Complete the Line

The Packard "Thirty," which will continue as the standard of the company, has been refined in many of the lesser details as compared with last year. As to the general specifications, the two-unit chassis design and the four-cylinder motor of 5-inch bore and 5 1-2 inch stroke, with a

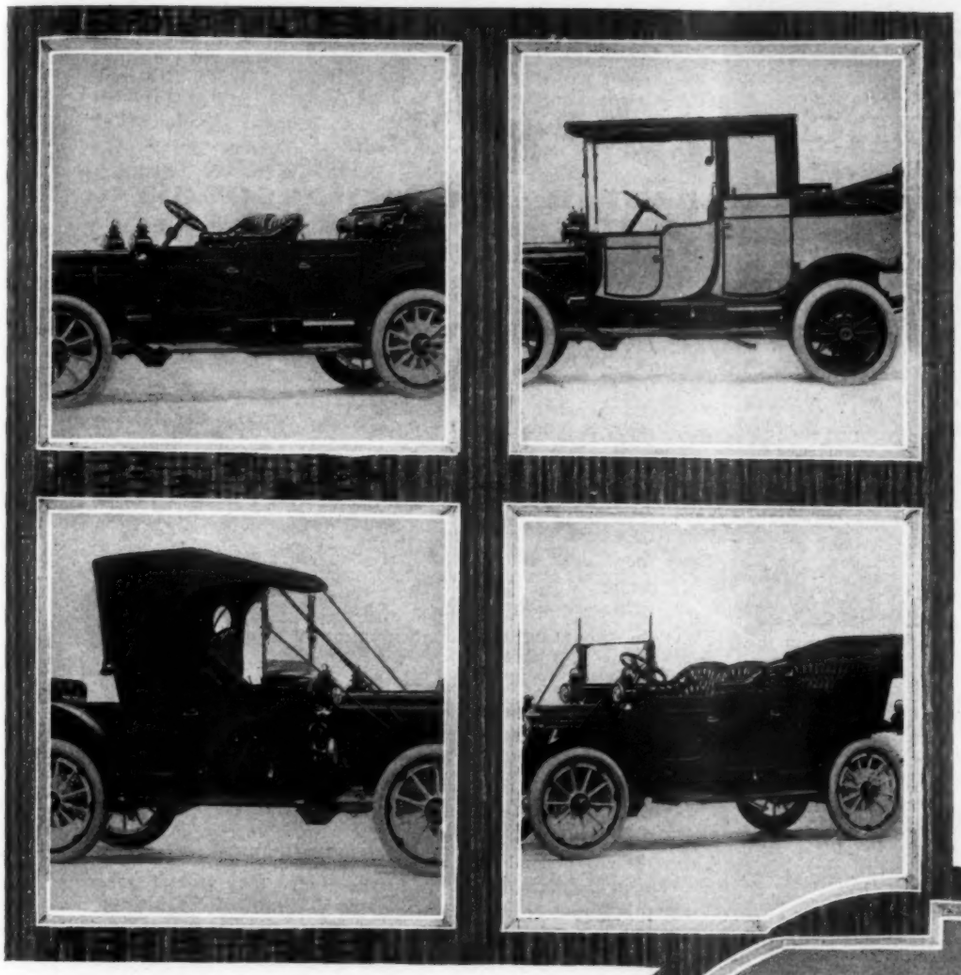


Fig. 12—1912 "30" touring car in standard finish and equipment
Fig. 13—1912 "18" runabout in standard finish and equipment, top included
Fig. 14—1912 "18" landaulet in standard finish and equipment
Fig. 15—1912 "18" open touring car in standard finish and equipment, including top

rating of 40 horsepower (A. L. A. M.), still obtains. The standard or close-coupled chassis of the 1912 car will be 123 1-2 inches; the phaeton chassis, 129 1-2 inches, and the runabout chassis, 114 inches, the tread in all instances remaining at the standard 56 1-2 inches.

In conformity with the wheel and tire sizes adopted in the new "Six," the equipment of the "Thirty" will remain at 36 by 4 1-2 inches on the front and 37 by 5 inches on the rear.

In the matter of styles and prices the choice offered is practically the same as that in the case of the "Six," the only difference being that there is a parallel increase in the case of the latter of about $800 in each style. The range of prices is as follows: Touring car with cape top, $4,200; phaeton or close-coupled car with cape top, $4,200; runabout, victoria top, $4,200; touring car, leather victoria top, $4,450; phaeton, leather victoria top, $4,415, touring car, full glass canopy top, $4,645; limousine, $5,450; landaulet, $5,550; imperial limousine, $5,650; imperial landaulet, $5,750; brougham, $5,500, and coupé, $4,900.

The "Eighteen" is smaller, but identical in design and construction with the "Thirty." The bore of the motor is 4 1-16 inches and the stroke 5 1-8 inches, giving a horsepower rating, according to the A. L. A. M. formula, of 26.5. The wheelbase of the standard or close-coupled chassis is 112 inches, that of the runabout chassis being 108 inches. The wheels and tires remain the same as the 1911 model, 34 by 4 inches front and rear. The capacity of the fuel tank of the standard chassis is 18 gallons, that of the runabout 27 gallons.

There are eight styles of the "Eighteen" listed: The open car, with cape top, $3,200; runabout, victoria top, $3,200; open car, victoria top, $3,415; limousine, $4,400; laudaulet, $4,500; imperial limousine, $4,600; imperial landaulet, $4,700; coupé, $3,900.

The standard equipment of Packard cars includes an extension cape cart top, with side curtains, corner light curtains, storm front and envelope, on all open cars except runabouts, the equipment of which includes victoria top, with corner light curtains, storm front and envelope; the storm front is omitted when corner light curtains are fitted to the windshield.

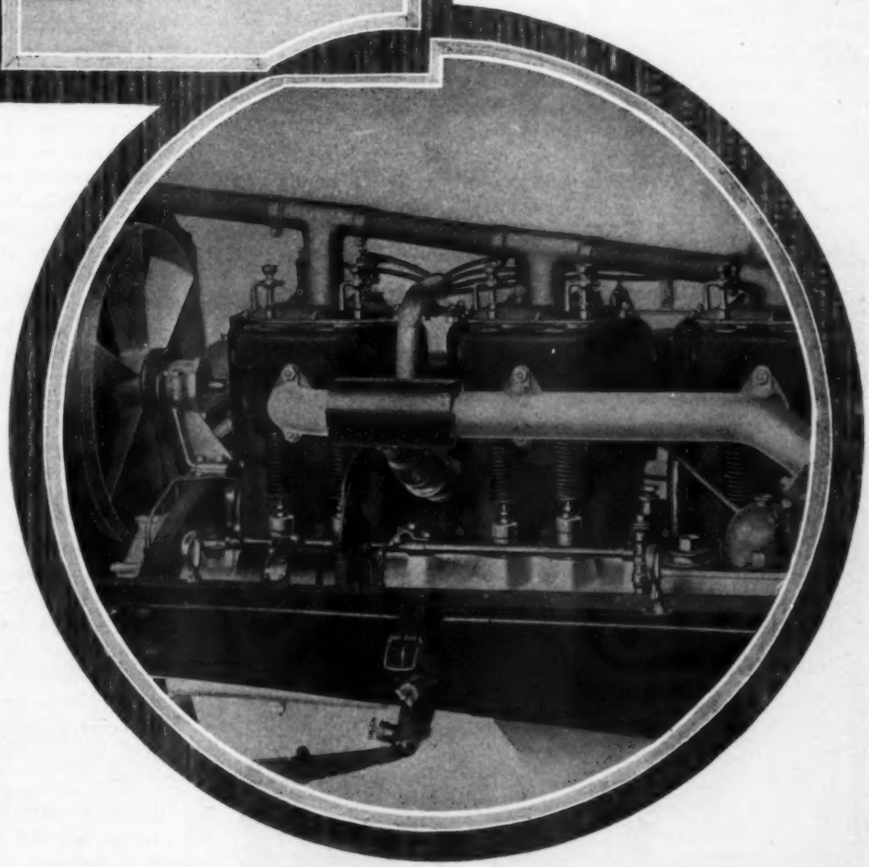


Fig. 16—1912 six cylinder motor, looking at the exhaust side, showing the compactness of design

It Stands to Reason

Exercising the Power of Reasoning Advantageously

It was a very learned person who said that when algebraic problems could not be solved by a mathematician, the reasoning power of a person as ordinarily endowed would suffice for every need. In a word, the every-day puzzles of the automobilist and the private citizen may be disposed of by a process of reasoning, even when the man of skill in this particular line is nonplussed.

THAT depreciation is the microbe that is most to be feared by the average automobilist may be taken for granted.

THAT the depreciation of tires should not be charged to the maker thereof, if it is excessive, unless it can be shown that the tires are given proper treatment.

THAT the presence of thousands of "chuck-holes" in the pavement of the streets in the city of New York, costing the automobilists $20,000,000 per annum extra, are responsible for the enormous bill that has to be paid.

THAT it would be better to give the city $20,000,000 per annum to pay for the repairing of the streets, for then the automobilist would not have to pay for the tires that are ground out under the present conditions.

THAT the attitude of the city government is eminently conventional considering political conventions, and that it is rather hard upon the automobiles that wend their way through a maze of chuck-holes.

THAT the roadway is the other half of the automobile, and that the average automobilist fails to understand this situation; otherwise he would be up in arms against those who are responsible for chuck-holes in the pavement.

THAT when the tires suffer as they do on ill-paved streets, the mechanisms of the automobiles also deteriorate unduly.

THAT there is no sense in trying to build automobiles of such a fine quality that they will last for a reasonable length of time jumping hurdles and dodging chuck-holes; it is cheaper to repair the streets.

THAT the automobile clubs to which the members owe allegiance owe the members something.

THAT the members of the automobile clubs ought to call around and see when payday is set.

THAT there should be a payday.

THAT the sleeping sickness creeps in upon those who are subject to hypnotic influence before they are made aware of the fact.

THAT they have to be nudged.

THAT they might become vexed if they are awakened too suddenly.

THAT the vexed person is not a fit leader for a caravan.

THAT the only thing to do if the occasion requires is to nominate a new leader.

THAT the fallen chief will express an aversion to surgery, but the greatest good should accrue to the greatest number.

THAT the pavement in New York City must be repaired.

THAT it is not enough to simply repair the pavement; it must be kept in a state of good repair.

THAT the streets should not be first paved and then opened up for the purpose of putting down water mains.

THAT the city officials who favor the plan of putting down pavement and then ripping it up know what they are about.

THAT the automobilists and taxpayers generally, if they know what they are about, have a funny way of expressing it.

THAT $20,000,000 per annum for 40,000 automobilists to pay is a large amount of money at the price of indifference.

THAT the game of hounding automobilists has been played with great enthusiasm for the past ten years.

THAT automobilists have enjoyed the situation immensely.

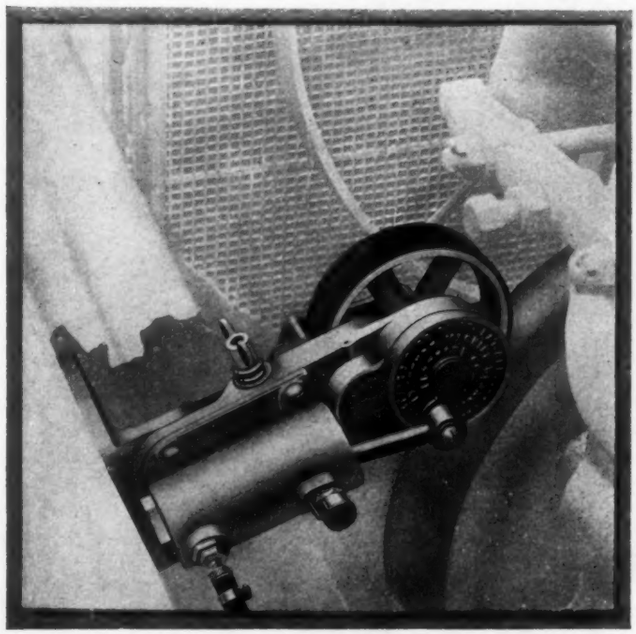
THAT turn about is fair play.

THAT automobilists are approaching the time when it will be their inning.

THAT automobilists expect to display more intelligence than that evinced by the principals in the game heretofore.

THAT those who have heretofore essayed to represent automobilists have strange and taking ways.

THAT the representation has been particularly lopsided.



Showing the Hartford single-action friction-drive power pump in position on an automobile ready for service

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The Use of a Power Pump

The large number of automobiles that have been made in the past and are running on the road without any provision for the application of a power pump to be employed in the inflating of tires, and for such other work as may be assigned to compressed air, has opened the way for inventive genius to a considerable extent, and the time has arrived when the automobilist is permitted to select pumps of this character, they being so designed that they are universal in their application, one of which is shown in the illustration here afforded.

NOTHING in the line of accessories can be put to such good use as a power pump by means of which the tires may be inflated to fullness. There are but few automobilists who are sufficiently athletic to permit them to wrestle with the problem of inflating the large tires as they are employed at the present

time, using a small hand pump for the purpose. Even the most skilled and stout chauffeurs fail to appreciate the needs when they are required to inflate the tires, employing small hand pumps, and they are much inclined to conclude that the tires are fully inflated, using as an indicator the perspiration that is induced on their manly brows during the pumping operation. According to this way of measuring the pressure in tires they will be quite well inflated in the cold in winter and they will be running flat when the summer's sun makes itself felt.

The power pump is an advanced idea that is saving a considerable amount of money for the type of automobilist who persists in its use, and the only question is how will it be possible to apply a power type of pump to an automobile that has been designed to the exclusion of this excellent device. The illustration as here presented of the Hartford type of power pump as furnished by C. S. Knowles, 7 Arch street, Boston, Mass., presents a pump of the desired characteristics, of light construction and convenient design. This pump is of the single-action type with a trunk piston and a double-reduction gear. The cylinder of the pump is flanged and bolted to a frame, with a means of adjusting the frame to the side bar of the automobile at a point adjacent to the flywheel of the motor, and a leather-faced pulley on the crankshaft of the pump is of suitable diameter so that when the pump is attached and the leather facing on the pulley engages the periphery of the flywheel of the motor the pump is driven at a speed which permits of compressing free air to approximately 100 pounds per square inch, or less, as indicated by the requirement when the tires are being inflated. The leather-faced pulley is pressed against the periphery of the flywheel by means of a suitable spring with a wingnut adjustment whereby the compression may be increased if the occasion requires. The double-reduction gear gives a ratio of 4 to 1. The height of the pump is 9 1-4 inches and the cylinder has a bore of 1 1-2 inches, with a stroke of 2 1-4 inches. Each pump is tested to 150 pounds per square inch in the inspection process. The outfit as shipped includes 12 feet of hose, by means of which air under pressure is led to the four wheels of the automobile. A pressure gauge is placed in the length of the hose by means of which the automobilist is permitted to know when his pneumatic tires are up to the required degree of inflation.

Horse Congests Cities

In this era of "back-to-the-farm" discussions would it not be wise in the effort to ameliorate the admitted evils of congestion in the large cities to consider the advisability of transporting the equine back to the green fields? Such a course would be fraught with advantage in the matter of elbow room, not to mention a much-to-be-desired improvement of municipal highways in the matter of cleanliness.

MORTALITY in congested centers is at an enormously high rate as compared with this condition in the Rocky Mountains, where the air is relatively pure, and the carbonic acid in the atmosphere measures 0.06 per thousand. Why should the mortality of the great cities be so enormously high? May we not say that the malady may be traced to over congestion? If so, would it not be to the point to apply a proper remedy? Obviously the remedy lies in reducing the congestion. Who will decide as to which part of the population that will have to migrate to a less congested center? On second thought, however, if it is a mere matter of getting rid of some of the inhabitants, why not get rid of horses? If there is any claim to distinction on the part of horses, for which they should receive an extra measure of consideration, surely this favor can be bestowed upon them by transporting them to green fields remote from the hard pavement of city streets. There are a dozen reasons why it would be a distinct advantage to bar horses from large cities, and once this problem is disposed of in the only way that common sense dictates, those who have to cope with the problems of mortality will have more time at their disposal for the purpose of telling Russian emigrants why they should take a bath.

The Automobile and Wheel Maker

Machine-Made Wheels to Hand-Made Standards

A re-statement of the not too well-known facts regarding the wood used in wheel making, and the methods in vogue in the plant of the wheel-maker, portraying the modern trend, and making a distinction between the wheels that are well contrived and those which are intended to satisfy the craving of the man who wants something for nothing. It is intended to show that the man who makes an inferior wheel is not justified in lying back on his threadbare statement to the effect that hickory is scarce and that he is doing the best that he can under a set of conditions that are not of his making.

RANGING in price from $11 to $60 per set for the wood of wheels as they are used in automobile work, there is a wide opportunity for the maker of cars to run the gamut of quality, and since his product is passed on to the user, who is the final arbiter, it remains for him to become acquainted with the vicissitudes of the wheel-maker's art in order that he will be able to tell the wheel-maker of his needs. It requires no stretch of the imagination in arriving at the conclusion that wheels cannot be too well made, in view of the fact that they support the moving mass, interpret the shock due to speed versus road inequalities, and sustain the effects of tangential force as cars swing at a high rate of speed around curves

Fig. 7—Example of a wrecked wheel, showing excellent qualities of the hickory employed

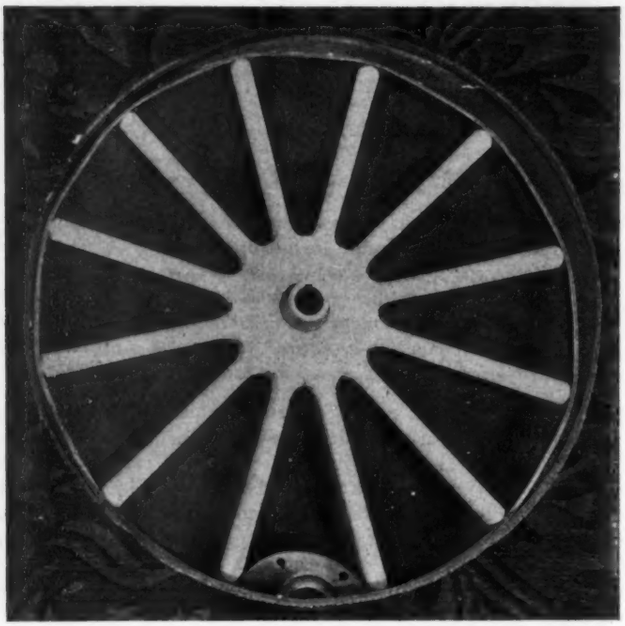


Fig. 3—Showing the assembling of the spokes of a wheel using a temporary band by means of which the spokes are gathered and spaced

of short radius, in addition to taking "chuck-holes," which are as scenery in the poorly maintained streets of some American municipalities.

Under the old conditions, as they obtained when carriage making was in its prime, the wheelwright was looked upon as a man of some importance. It was for him to so fashion the wheels of carriages that they would do the work that is now abandoned to pneumatic tires, and his way of producing wheels that were responsible for the easy-riding qualities of carriages was to take advantage of the fine qualities that reside in hickory, so fashioning the spokes as to take advantage of the natural resiliency that resides in wood, nor was it below his dignity to utilize the qualities that were well known in the Indian's bow. The carriage wheels were of large diameter, and of dished shape; moreover, the spokes were not only slender, but they were of varying section, changing from the ellipitical, with the major axis in the plane of the wheel at the outer extremity, to the elliptical, with the major axis in the plane of the axle at a point about one-third out from the hub, ending in a rectangular section at the approach of the hub, and terminating in a mitre within the hub flanging.

Spoke work, as it was understood by the wheelwright of ancient history, was an art. The idea of trying to fashion the spokes by a machining process was abhorrent to him, and as for recommending an undished wheel, it was far from his talents, for in all truth he recognized the principle which takes advantage of the fine qualities of wood in compression, and the reason why he dished the wheels that he made was to bring all the spokes into compression simultaneously, if perchance, under road conditions, the carriage skidded, for as anyone will readily observe, the length of a spoke in a dished wheel is so great that all of the strain comes upon the tire, due to the fact that the spokes as they are placed in the dished wheels are in length greater than the diameter of the rim.

The old wheelwright understood woodcraft, and he looked upon his knowledge in this regard as a fine requisite. Of the many varieties of hickory that Nature affords, there were but few of them that held any attraction at all in wheel-making work, and of the varieties of this wood that are worthy of serious consideration but a small percentage of the product was considered good enough to employ in the wheelwright's product.

When hickory of the proper genera is discovered in its native haunts, and trees of suitable size are felled by the axe-man, if he is a person of no stamina, and is directed by the bent of his own sweet will, the old wheelwright would discountenance his effort, due to the fact that the wood so felled would fall far short of the best requirement, if indeed it might not be too poor to employ under the worst examples of wheel-making. It is by no means sufficient to cut down trees and after they lie around in the woods for a time to cut them into lengths for haulage to points of use, and the man who is skilled in woodcraft, since he must measure his wit against the wheelwright who has the selection of the wood for his purpose, takes good care to do the chopping in mid-winter, at a time when the snow is knee-deep on the ground, when the probabilities are that the wintry weather will be unchanging for even months, and if there is any complaint to be made against this woodsman of some discrimination, it lies in his lack of appreciation of the fact that a good many spokes are wasted as they rot away in the high stump of the trees, due to his axing work instead of employing a cross-cut saw, making the cut as near to the ground as possible.

The Felled Hickory in Its Green State Is Valueless for Spoke and Felloe Work and It Must Be Seasoned First in the Woods and Thereafter in the Kiln Under Precise and Well-Contrived Conditions

The trees, after they are felled, are cut into suitable lengths, when the trimming is done, and are corded. This process is carried on in the limited way that accords with the facilities and

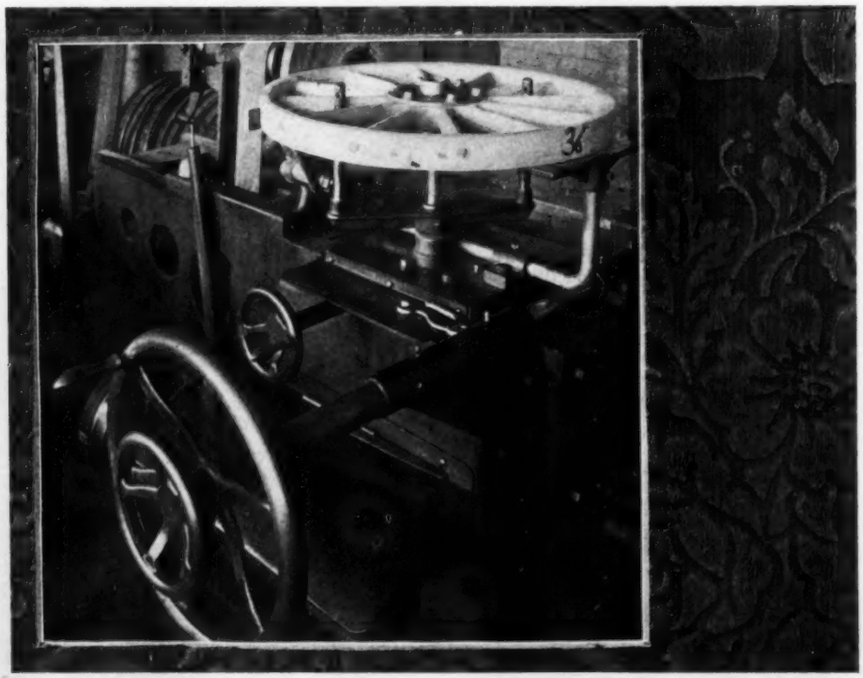


Fig. 2—Type of sandpapering machine used in the Pierce-Arrow works, by means of which the felloes are sandpapered to uniform diameter and given a smooth finish

the wood supply of the average farmer whose wooded land measures up to a relatively small acreage, and his methods are wasteful, due to the fact that he chops all of his wood to cord measure, and in spoke-work the wastage is excessive. In the forests where hickory abounds in sufficient quantity to attract the notice of the lumberman, regular logging methods are employed, and in view of the scattered supply of the hickory as it is mingled with other specimens in the forest, the logging is at some extra cost, and even under the best conditions there is a considerable amount of waste at the mill. Statistics would seem to indicate that fully 40 per cent. of the logged hickory goes to waste. When the lumberman undertakes the task of supplying the spoke market, the rough stock, so called, is shipped green, so that the freight charges on hickory are doubled as compared with the same charges on seasoned pine.

Preference is given to rived billets by spoke-makers, and the best price is paid for the wood so produced, but it is a wasteful process, at best, although it possesses the inherent advantage of automatically eliminating the so-called "bastard" spokes, and heart wood is also cast out by the wheel-maker because of the poor service that it is likely to render, in view of its age and loss of elasticity.

Characteristics of Spoke Billets That Attract the Notice of the Discriminating Wheelwright, Whose Quest Is for Quality and Whose Methods of Discrimination Lead to Wastefulness

In the avoidance of waste, after the trees are cut they are reduced to the lengths known as round bolts, which are hauled or shipped to the mill, where they are sawed. A cord of hickory will yield about 700 rived spoke billets, or 900 sawed billets for the same purpose. There will be a bi-product of some 250 to 300 helves from each cord of hickory. In the sawed hickory there will be a certain percentage of "bastard" spokes, and there will be greater difficulty in the discovering of bird-pecked wood. It is claimed by those who have been giving the subject much consideration of late that there is too much prejudice against heart-wood, the product that shows discolorations, and bird-pecked wood. It is said by foresters that these selections of hickory are not necessarily below a fitting strength and as a general proposition it is claimed that for each genera of hickory the best register of quality is indicated by specific gravity. It is said that the best wood has the highest specific gravity.

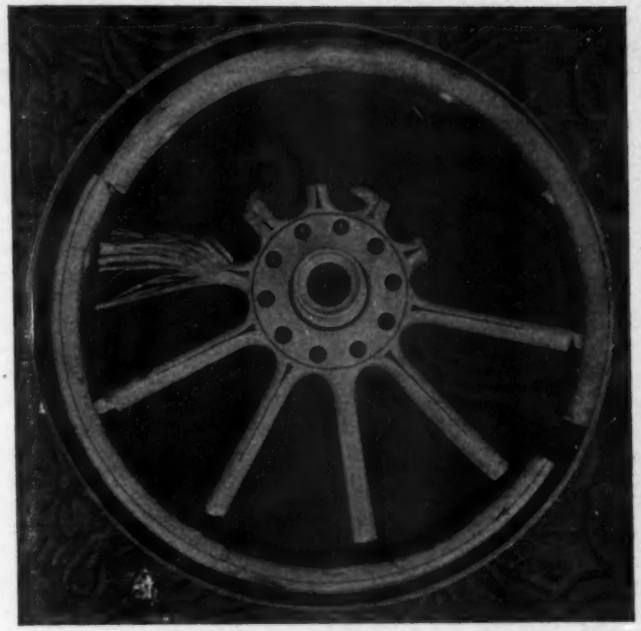


Fig. 5—Showing a wrecked wheel in which the wood was of moderate quality and extra good in two of the spokes

The wheelwright selects white wood for first-class work. Red wood brings barely one-half of the price of white wood. Upper cuts are discriminated against. Lower cuts of white wood rank as A1. The upper cuts even of white wood are barely on a par with lower cuts of red wood, due to the knotty characteristics of the upper portions of the logs. For absolutely first-class spokes, the forester-wheelwright would express a preference for sap wood, clear white, taken from the butt of the tree. There is some logic in this selection, due to the fact that the specific gravity of the white sap wood from the butt of the tree is considerably more than the same index in equally good appearing white wood from an upper cut. Nature seems to have put her strongest material at the foundation.

It is a common practice to cut the spoke billets to a length of 30 inches, which practice was instituted in the days of the carriage and the wagon-maker, and this system is leading to a great sacrifice of the finer grades of material, due to the fact that a 30-inch billet is insufficient in length to make two automobile wheel spokes, but it is much longer than is required in the making of one automobile wheel spoke. A revision of this practice is much in need, and this is one of the matters that the Society of Automobile Engineers might well take notice of; rather with the expectation that while there is no real scarcity of hickory of the better grade for spokes at the present time, even so, the rate at which this wood is being felled augurs for a shortage of supply within the next twenty years, unless reforms are immediately instituted, and hickory forestry is established on a

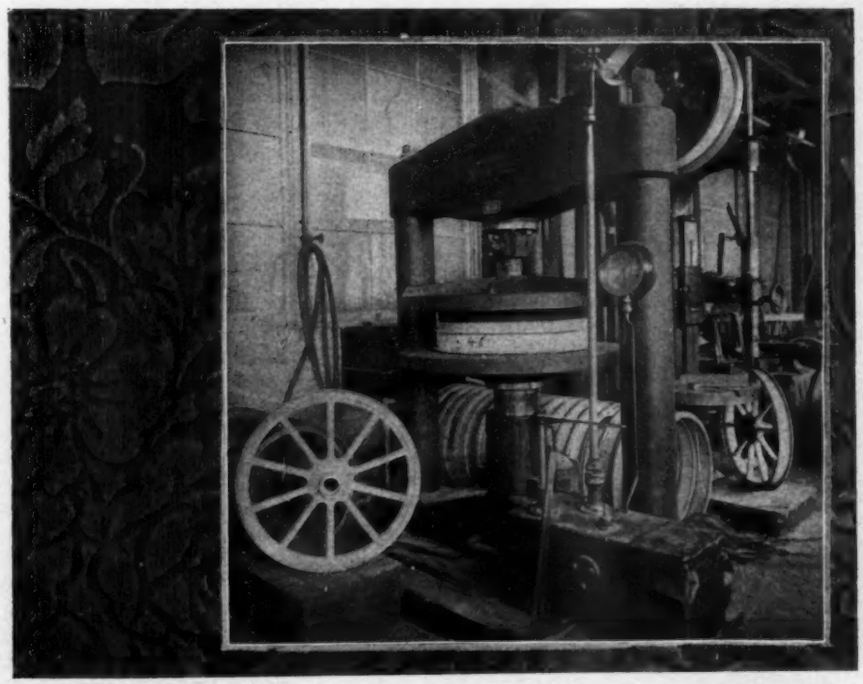


Fig. 1—Defiance type of hydraulic press used for putting clincher rims on wheels

commercial basis in view of the excellent prospect that it affords as a paying investment.

It has been pointed out by the Forestry Service of the United States Bureau of Agriculture that the hickory used in this country at the present time is for the purposes as follows:

Actual cut per annum.....	450,000,000 board feet
Used for industrial work.....	335,000,000 board feet
Employed in automobiles.....	9,000,000 spokes
Used for fuel.....	1,000,000 cords

These statistics indicate that the spoke industry, in which the automobile makers are vitally interested, is but 10 per cent. representation of the hickory felled. To this 10 per cent. must be added the 40 per cent. wastage that accompanies spoke making.

Of the Varieties of Hickory That Are Indigenous in America a Preference Is Expressed for Certain of Them in the Making of Spokes

Intelligent cutting will have much to do with the conserving of the hickory supply, and an effort should be made to depreciate the cutting of trees of relatively small diameter. A 12-inch butt is the minimum size that should be cut; moreover, the quality of the spokes will be of a low standard unless the trees are of good diameter. There is no hard-and-fast rule to be followed in matters of this sort, and a woodsman is normally a good judge in this respect, but the way to regulate the whole situation is to discourage the purchase of billets that are obviously produced under wasteful and destructive conditions. That the commercial exploitation of hickory can be regulated is shown when reference is made to the fact that red wood has little or no sale, and a preference is given to white wood. The lumberman is bound to supply his market and he will furnish the character of wood that will bring him the highest price. If, in the course of time, an attempt should be made to discourage wasteful methods, it will not be too much to expect that the wheel-maker shall become acquainted with the good qualities that reside in red wood, and if bird-pecked wood proves to be of adequate strength, there is no reason why it too should not be employed in wheels.

According to information afforded by the Forestry Service, the principal hickories that are indigenous in America may be cited as follows: Among the true hickories the common shagbark (*Hicoria ovata*), so called because of its peculiar bark, also known as "scaly-bark" and "shell-bark," is the most widely known. The shagbark attains large size, and heights of from 130 to 140 feet, and diameters of from 20 to 30 inches, are fairly common in the Cumberland Mountains. In the river bottoms along the Mississippi the trees grow to larger diameters, but the maximum height growth is usually less. The southern shagbark (*Hicoria carolinæ septentrionalis*) is a recently distinguished species of but little commercial importance.

Fig. 6—Showing two spokes from a wheel after a wreck, indicating the highest quality of hickory for the purpose

Very similar in appearance to the common shagbark is the big shellbark, or king nut (*Hicoria laciniosa*). Lumbermen rarely differentiate between the two species, although they are quite distinct.

Of all the hickories none is more important than the pignut, and none offers more difficulties to the botanist. It is exceedingly variable and grows under widely differing conditions of soil and climate.

The mockernut (*Hicoria alba*) generally is smaller than either shagbark or pignut. The stem is less likely to be straight, and the branches are heavier.

In the forest the hickories are rarely predominant. Except through the interference of man, they do not grow in pure stands but always in mixture, somewhat group-wise, with other species, and especially with the oaks.

Salient points of the botanical distribution of hickory are the wide distribution of the true hickories, especially the pignut and the shagbark, and the centering of the distribution of nearly all the species in the lower Mississippi Valley, in western Tennessee, eastern Arkansas, and northwestern Mississippi.

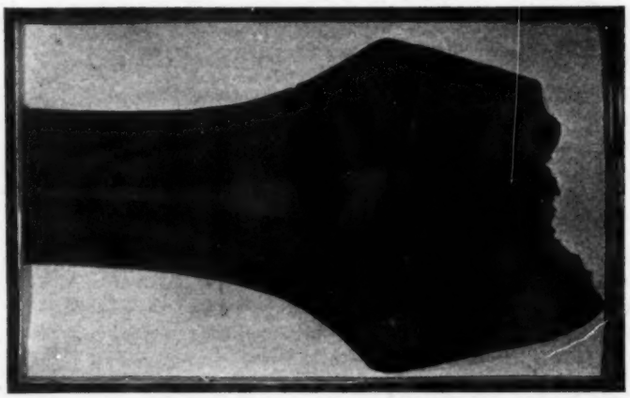


Fig. 4—Example of heart wood that proved to be of no great strength in service and the wheel in which it was used collapsed

Of all the species, shagbark and pignut are most widely and evenly distributed, and these two furnish the bulk of the hickory of commerce. Since most of the remaining virgin hickory is in the lower Mississippi Valley, and since cutting is now especially heavy there, it is probable that most of the hickory on the market is shagbark.

The commercial distribution of pignut corresponds closely to that of shagbark, except that it extends further toward the coast in the southeast.

Mockernut is characteristically a southern species. It is abundant in the lower Mississippi Valley, but is commercially less important than shagbark.

Big shellbark has a narrow commercial distribution. It is most prominent in the region around the lower Ohio River, south along the Mississippi to central Arkansas, and northeast through the Wabash Valley to northern Indiana and Ohio.

Technical Qualities of the Wood Must Be Studied in View of the Modern Requirement Over That as It Obtained in Carriage Building in the Past

If it may be said that hickory is given a preference in wheel-making because of its toughness, strength, and elasticity, it becomes important to know the extent to which these qualities reside in the various genera of hickory, and under what conditions in the forest these requisites are accentuated. It is not enough to merely discover that the tendency in a certain type of hickory is for toughness as compared with this property in some other type of the same wood, and the trees must be studied in their native haunts, rather with the expectation that selection

will be in view of the character of the ground on which the tree is found, since the strength and toughness of the wood will vary with the topography of the land, it being different for a tree that resides in a swamp as compared with a tree that may have grown up on high ground. In the Forestry Service it is the custom of the foresters to take flitches from the center of the butt log from bark to bark of trees from various localities, and of each genera of hickory, and to cut these flitches into sticks 2 1-2 inches square and 30 inches long for purposes of testing. The specimens intended for green tests are immersed in water until the time arrives for testing, it being the idea to preserve the green condition. The temperature of the wood is taken during the testing operation, and a record thereof is made. In green testing work, the specimens are removed from the water, planed to 2 inches square, and sawed to a uniform length of 28 inches for the bending test. After the bending test is concluded the specimens utilized in the test are taken, and from the uninjured portion thereof specimens are cut and subjected to tensile and other tests.

In cutting test pieces from flitches, while it is desirable to pick

Fig. 9—Example of a spoke that is taken from a wrecked wheel and split, showing a mixture of white and red wood with a well-defined grain and cellular structure

the specimens at random in order to arrive at an average condition, the fact remains that it would be proper to weigh the test specimens after they are sized, in order that the specific gravity of the wood may be arrived at, and a record should be kept of the strength, in view of the specific gravity, whereby evidence will ultimately be afforded to the workman in the plant, thus enabling him to observe uniformity in the selection of spokes, so that for wheels that have to perform in high-speed automobiles the wood used will be of strength accordingly, and the relatively poor selections of the wood will be left for use in the types of automobiles that do not go at a high speed. It would also be of advantage were the workman to be placed in possession of the character of information that would permit him to separate out "shakes" and "culls" and to be able to observe when a visible defect is of such enormity as to warrant discarding the wood. In systematic testing, the specimens are accurately measured and weighed. The percentage of sap wood is measured, and the number of rings per inch are counted. The non-porous part of the annular rings is measured, and its proportion is determined, expressing the same in per cent. of the whole growth. The moisture content of the wood is expressed in per cent. of the weight of the dry wood. Static bending tests are made as being of relatively great importance, using test specimens 2 inches square and 28 inches long, the supports being of the knife-edge variety separated 26 inches. In this test it is necessary to employ plates and rollers in order to avoid the crushing of the specimen, and the doing away with any friction at the end bearing. It is customary to note the amount of bending for each 100 pounds increased in load up to the point where the specimen begins to yield.

It has been found in practice that the specific gravity of the various types and specimens of hickory ranges between 0.450 and 0.800. Very few of the specimens reach the high limit stated for the specific gravity, and correspondingly but few of them are of the low specific gravity named. For the best types of spokes the specific gravity should be in the neighborhood of 0.700, and generally it may be inferred that the quality of the material for spoke purposes increases as the specific gravity.

That the specific gravity is a good measure of spoke quality is shown from the fact that when the specific gravity is in the neighborhood of 0.450 the tensile strength in pounds per square inch is about 8,200. whereas with a specific gravity of 0.750 the tensile strength in pounds per square inch is about 12,200. Tests seem to indicate that the tensile strength goes up uniformly with the specific gravity, although there is a slight disproportionate gain when the specific gravity reaches about 0.575.

When the woodsman refers to "second-growth" hickory he has in mind the variety of wood which is distinguished by wide rings. It has been found in practice that the wide-ring hickory has relatively great shock-resisting ability. This will be true when the range of rings is within 5 to 14 per inch. From 14 to 38 rings per inch the shock-resisting ability is on a fairly constant basis, but beyond this point up to 47 rings per inch the shock-resisting qualities are not so pronounced. It would seem to be a good idea to take into account the number of rings per inch in selecting hickory for spoke work, and to avoid the use of this wood when the number of rings per inch exceed 38.

For absolutely first-class spokes, and the same will be true of felled, the wood should show from 14 to 20 rings per inch; it should be white, free from bird pecks, and have a specific gravity above 0.700, after it is kiln-dried and all the sap is driven off.

FARMERS sometimes argue that the horse is of value to them aside from his ability to draw a wagon, in view of the fact, as they say, that when wheat and other farm products such as man consumes is not in good demand the extra burden imposed in the process of growing oats and barley for the feeding of horses is in the nature of an advantage. This is an ingenious presentation of a fallacy. The wise farmer is alive to the fact that the nitrates contained in the ground are of exceeding value to him and that his farm will depreciate in value as these nitrates are withdrawn and that the feeding of horses seven days in the week, whether or not they work, is slowly but surely eating into the inherent value of farm land, whereas the hydrocarbon fuel that is used by automobiles is taken from the bowels of the earth remote from the surfaces that produce on a farming basis, so that there is no sound argument in favor of having a by-product on a farm, making it necessary to utilize and feed horses simply because the market for other growths is affected somewhat on occasions by the abundance of the supply.

Fig. 8—Showing a wheel after it was wrecked, indicating the finest grade of hickory as used in spoke work

Cork Inserts Fitted to Existing Leather-Faced Clutch—Taking Flywheel from Tight Shaft

Editor THE AUTOMOBILE:

[2,623]—I was very interested in your reply to letter in the recent number of THE AUTOMOBILE concerning the method of adapting cork inserts to existing leather-faced clutches. Unfortunately in the type of clutch fitted to my car there is not sufficient room to fit the type of cork holders you suggest. Is there any other method you can suggest to effect the same result? As I am at present overhauling my car I should feel obliged if you will tell me the easiest method of withdrawing the flywheel. TROUBLE.

Trenton, N. J.

The type of insert recently illustrated has the advantage of being adjustable without taking the clutch apart, but a permanent fitting can be made in the following manner: After taking the male member of the clutch out of the car it is necessary to remove the leather and with a saddler's punch make a series of 1 1-4-inch holes at equal intervals. The punch will give a bevel effect to the leather if the hole is made from the opposite side of the leather that comes in contact with the flywheel. Obtain several corks and fit one in a pipe that has 1 1-4 inch inside diameter. With a sharp knife cut off strips 1-16 inch thicker than the leather. Then place the strips in the holes in the leather and while they will protrude slightly the bevel effect of the punch will retain them in position. A little shellac might also tend to make them adhere to the flange. Fig. 1 shows a clutch in section with such inserts placed in postion. The method of withdrawing a flywheel is clearly shown in Fig. 2.

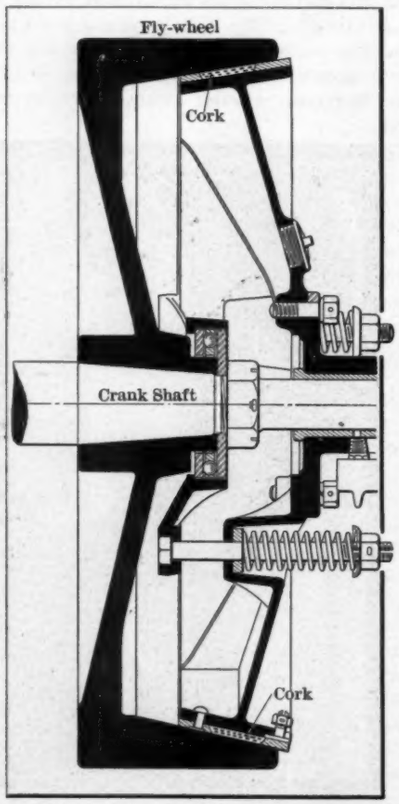


Fig. 1—Cross sectional view of a leather-faced clutch, showing home-made cork inserts in position.

What Some Subscribers Want to Know

The Editor invites owners and drivers of automobiles who are subscribers to THE AUTOMOBILE to communicate their automobile troubles, stating them briefly, on one side of the paper only, giving as clear a diagnosis as possible in each case, and a sketch, even though it may be rough, for the purpose of aiding the Editor to understand the nature of the difficulty. Each letter will be answered in these columns in the order of its receipt. The name and address of the subscriber must be given, as evidence of good faith.

Chamfering Base of Cylinder to Facilitate Replacing

Editor THE AUTOMOBILE:

[2,624]—In replacing the cylinders on my motor recently I had the misfortune to break two piston rings and after a lot of trouble succeeded in inserting the pistons. What is the best method to employ to replace the rings? J. W. AMSDEN.

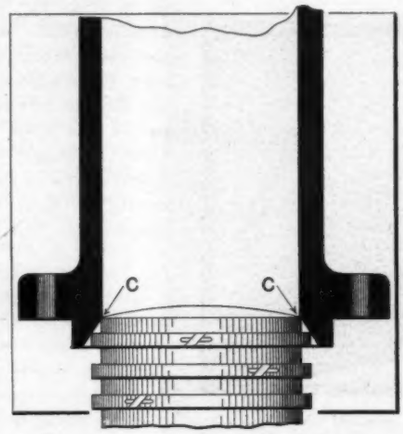


Fig. 3—Showing the base of a cylinder chamfered, which allows the piston to be inserted without breaking the rings

Buffalo, N. Y.

In the majority of the better class cars the base of the cylinder is chamfered in the manner shown in Fig. 3 at C. It will be seen that when the piston is inserted in the cylinder the taper causes the rings to contract without any help on the part of the workman. In case you have to take the cylinders off again it might be a means of preventing your present difficulty if you have the bases of the cylinders chamfered in the manner shown.

Cap Fitted Over Push Rod Guides will Prevent Loss of Oil

Editor THE AUTOMOBILE:

[2,625]—I have been troubled for some time with the valve push rods of my motor. They seem to be a good fit and work silently, but the oil leaks out after about 20 miles running and puts the motor in a terrible dirty state. Would a cap be of any use? ECONOMY.

Paterson, N. J.

A cap should overcome your trouble and can be fitted in the manner shown in Fig. 4. It is screwed to the outside of the existing guide, allowing a certain amount of space inside for the pumping action of the plunger which tends to suck the oil upward, and it is herein that your trouble lies.

The Tires Will Give Poor Satisfaction

Editor THE AUTOMOBILE:

[2,626]—I am making a two-passenger light roadster equipped with 28 x 3 -inch tires. Now, will a four-cycle, 20-horsepower motor be too much weight upon tires? If so, what power and number of cylinders should I equip it with? What make of motor would you advise me to use? Also air or water-cooled?

L. M. GAYLOR.

Rockland, Wis.

The 20-horsepower, four-cycle, water-cooled motor will be an excellent selection. An air-cooled motor of the same power would be satisfactory. The tires are too small; 30 x 3 1-2 inch tires would be satisfactory.

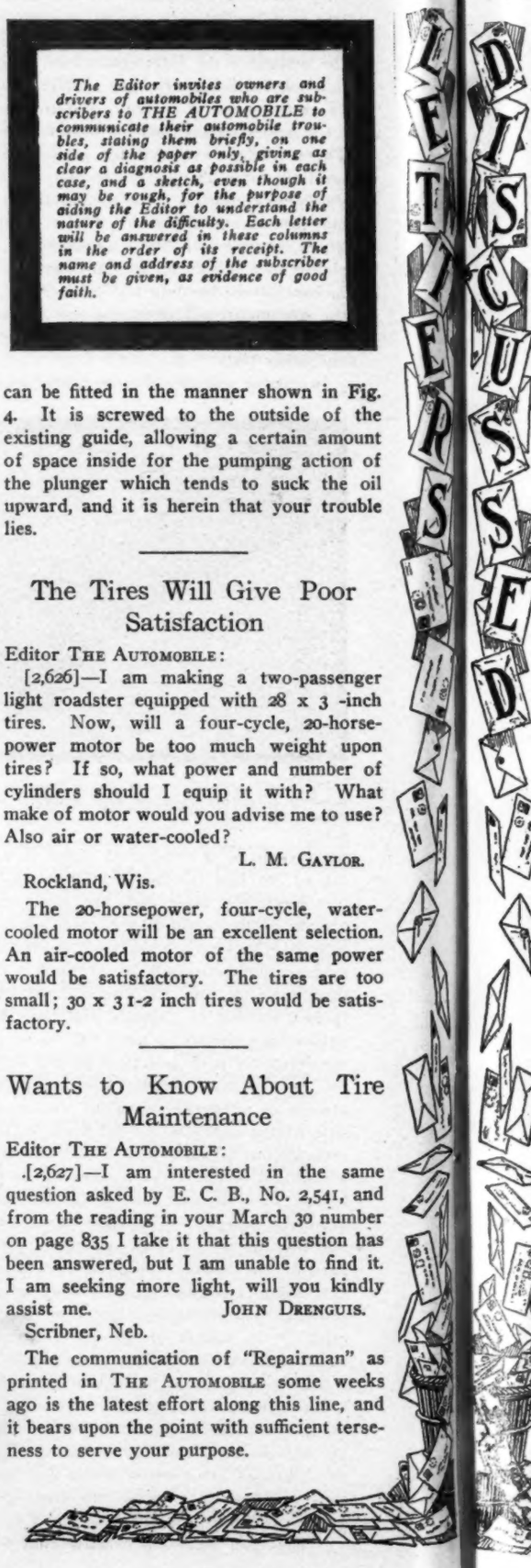
Wants to Know About Tire Maintenance

Editor THE AUTOMOBILE:

[2,627]—I am interested in the same question asked by E. C. B., No. 2,541, and from the reading in your March 30 number on page 835 I take it that this question has been answered, but I am unable to find it. I am seeking more light, will you kindly assist me. JOHN DRENGUIS.

Scribner, Neb.

The communication of "Repairman" as printed in THE AUTOMOBILE some weeks ago is the latest effort along this line, and it bears upon the point with sufficient terseness to serve your purpose.



What Other Subscribers Have to Say

The Editor invites owners and drivers of automobiles who are subscribers to THE AUTOMOBILE to communicate their personal experiences for publication in these columns for the worthy purpose of aiding brother automobilists who may be in need of just the information that this process will afford. Communications should be brief, on one side of the paper only, and clearly put, including a rough sketch when it is possible to do so, and the name and address of the writer should be given as evidence of good faith.

Gas Tanks Are Packed by a Special Process

Editor THE AUTOMOBILE:

[2,628]—Since the gas pressure in a tank such as is used in illuminating work is very low, the question is, how is the tank made to hold so much of the gas as seems to be the case? As a rule, one would say that there would be so little gas in a tank at a pressure not far above the atmosphere that it would not be worth while to take note of it, but a gas tank, as it is used in automobile lighting, seems to do good work for quite a long time after the pressure falls to a point quite near that of the atmosphere; there must be some secret attached to this process. S. M. COLLINS.

New York City.

Acetylene gas, were it put in a tank under pressure in the ordinary way, would be likely to explode, due to its detonating properties under certain conditions. The amount of gas that might be stored by the strictly pressure system, would also be too restricted, considering any pressure that should be regarded as safe. If a stout steel tank is filled with asbestos wool and this wool is saturated with acetone, it will then be found that the acetone will have a certain capacity for acetylene gas at a given temperature and as the temperature is lowered the amount of the gas that is taken up is on an increasing basis.

The function of the asbestos wool is to take up as much as possible of the acetone and the property of the latter is such that it will absorb acetylene gas on a basis of many times its volume. It is a fair expectation that a properly made tank filled as above will hold 16 times more acetylene gas than the same tank under ordinary conditions. It has been found in practice that the usual sizes of tanks under a pressure of one atmosphere (one atmosphere is equal to 14.7 pounds per square inch) compare as follows:

Capacity of Tanks in Cubic Feet of Acetylene

Size of Tank.	Holding Gas Only.	With Asbestos and Acetone.
6 x 20 inch	2.44	40
7.5 x 22 inch	4.20	70
8 x 30 inch	6.51	100

In filling tanks after they are prepared, the temperature is lowered by a refrigerating process, and the lower the temperature is maintained the greater will be the amount of the gas that the acetone will take up. It is also true that repeated applications of the process will have the effect of packing the acetone with more of the gas.

Help from an Autoist of Experience

Editor THE AUTOMOBILE:

[2,629]—Having noticed "Constant Reader's" query, No. 2,593, in your issue of

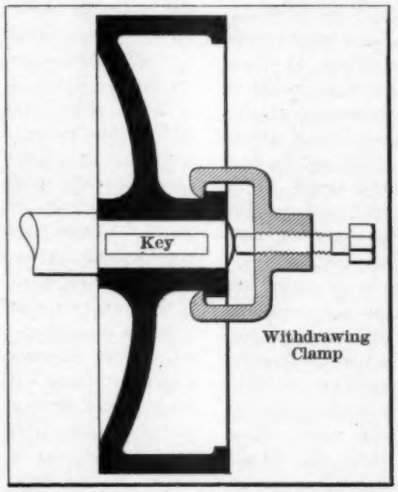


Fig. 2—Method of withdrawing fly-wheel from crankshaft and the tool used for the purpose

March 30, I wish to state that I have twice had the same trouble after letting out the water on a cold night. The first time the difficulty disappeared, but the second time I had the car overhauled, and the wheel in the centrifugal water pump was loose on the shaft, the pin having been sheared off. This was due to the ice in the pump, the hot water not having dissolved same before the motor was started. I trust this may help "Constant Reader" out of his difficulty. J. EDWARD SCHMIDT.

Lebanon, Pa.

The Pleasures of a Trip from New York to Washington

Editor THE AUTOMOBILE:

[2,630]—Will you kindly give me some information in your "Letters Interesting" column concerning a trip from New York to Washington along the following lines:

Particular reference to the condition of the roads between Philadelphia and Baltimore, and how early in the Spring could one be assured of a road bed good enough for a strictly pleasure trip. I am informed that at times the road between Philadelphia and Baltimore, in places, is nearly impassable for automobiles; just how bad is it?

Is a New York automobile license recognized in Delaware, Maryland and the District of Columbia at the present time?

Newburgh, N. Y. TOURIST.

The trip from Philadelphia to Baltimore is never a good one on account of about twenty miles of poor dirt road between Newark and Perryville. This has been characterized by a native as being bad when dry and worse when wet. Paradoxical as it may seem, it is at its best when neither very wet nor very dry. To add to the annoyance and danger of this stretch of road it has recently been torn up and a detour is positively necessary. At Newark, Del., instead of following the Blue Book route keep straight ahead into Calvert, where turn left for Rising Sun and Perryville. We understand that this trip can be made with safety and even pleasure.

A New York automobile license is recognized in Delaware, Maryland and the District of Columbia. As a matter of precaution, however, upon arriving in Washington a car should be registered with the secretary of the Automobile Board within twenty-four hours.

The forthcoming Vol. 3 of the Automobile Blue Book we understand will be very much improved with many new routes extending into the South.

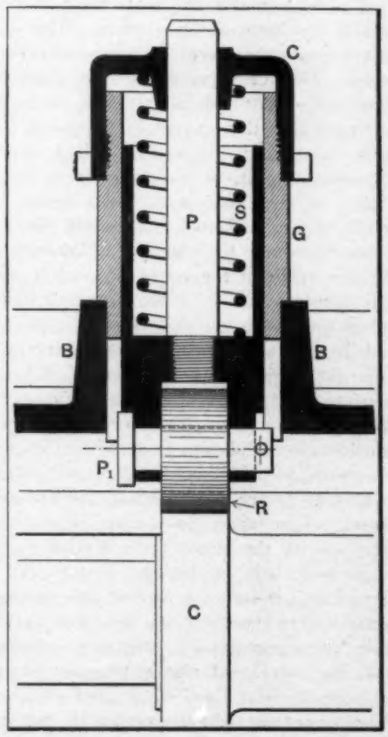


Fig. 4—Showing how a cap can be fitted over push-rod guides to prevent oil from leaking

Importance of Annealing Steel

Annealing Work Stated as a Simple Problem

E. F. Lake makes a simple statement of the ways that annealing is done for the best result, and by photomicrograms he shows the effect of disregarding the annealing process, resulting in the development of microscopic flaws that grow and prosper to the undoing of the steel; but, as he points out, this failure comes after the steel is placed in service. Those who are interested in the proper annealing of steel, if they are not on a good footing with the processes in vogue, will be the gainers by looking into the matter, of which this is a primary exposé.

IN the manufacture of motor cars many different kinds of steels are used for the various parts. All of these should be thoroughly annealed after every manufacturing process, and before they are heat-treated in any other way, as these throw the metal out of its equilibrium and cause the cohesive force that binds the molecules together to exert unequal strains throughout the mass. Annealing relieves any internal strains that may thus be put into the metal by casting, rolling, forging and pressing, or otherwise giving it the desired shape. This rule has been laid down by every steel maker and metallurgist. In the rush to turn out cars, however, it may be neglected, with the result that breakages may occur. While the annealing of steel has been neglected in so many instances, it is really one of the most important treatments given the metal, and especially so for metals that are to be hardened, tempered or carbonized.

The first mechanical working a steel gets is the hammering given the ingot after pouring. This has a tendency to crush the crystals that form the mass, whether it be hammered hot or cold. This crushing brings the particles of the metal closer together, and many metals will show nearly twice the tensile strength that they would in the ingot. The density that can be given a steel in this way is limited, and after the limit of compression is past, as it usually is in practice, the hammering is liable to cause coarser crystals where the metal squeezes out from under the blows. Annealing, therefore, has to be resorted to at this stage to bring the metal back to its natural condition. If this is so in the crude product it should be plain to motor car builders that it would be much more liable to be the case when the metals are drop-forged or pressed into shape.

When we examine a steel under the microscope in which these internal strains have been set up, it is very liable to present a surface similar to that shown in Fig. 1. These irregularities can be caused by most any form of mechanical working that the steel has been submitted to. If motor car parts are finished with the metal in this condition, any vibrational strains that they are submitted to are very liable to cause these microscopical flaws to develop into larger ones, such as are shown in Fig. 2. These may also be developed from heating up the steel and quenching it, as is done in hardening.

In Fig. 3 is shown a further development of flaws of this character. This appeared in a very low carbon steel, as is shown by the ferrite constituent being predominant. Fig. 4 shows a flaw that has developed into a pronounced crack, and such a piece of steel is short lived when used on any part of an automobile. The higher the carbon content in the steel the more liable are such flaws and cracks to develop from internal strains. They might not show until the car had been put into actual service, and then cause the part to break when it is least expected.

Annealing consists of the thermal treatment by which the metal is heated to a point just above its highest recalescent point and then allowing it to cool gradually. At this highest point of recalescence a change in the molecular structure of the metal takes place and a new crystal size of grain is born. When the temperature of the metal is rising or cooling it always hesitates at this point long enough for the molecules to readjust themselves and thus refine any large or coarse crystals resulting from former operations. During this change the cohesive force equalizes itself throughout all of the piece.

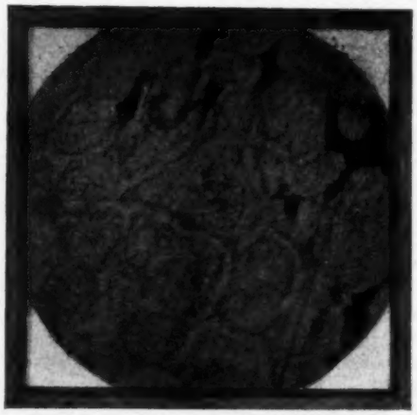


Fig. 1—Depicting flaws developed from internal strains, the usual result is that these flaws grow when the steel is placed in service

The point at which this molecular change takes place varies with different kinds of steels. Carbon has considerable control over the degree of temperature at which it occurs, and all of the alloying materials alter it more or less. In low carbon steels this transformation point is comparatively high, while in high carbon steels it is low, covering a range of from 1350 to 1650 degrees Fahrenheit.

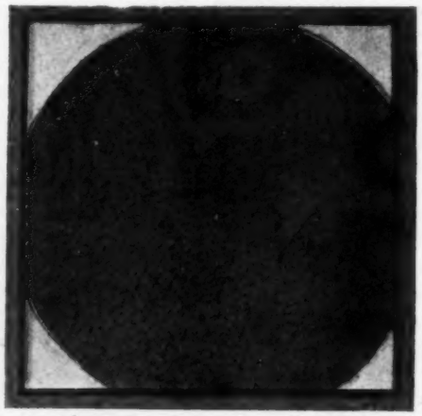


Fig. 2—Steel with flaws caused by mechanical working; these can be removed by annealing

Annealing cannot be done instantaneously if the best results are to be obtained, and its effects are greater when the time consumed is lengthened. First the steel should be heated slowly up to about 600 degrees F., at which point a change in the structure takes place. From this on, to the highest point of transformation, the heat may be applied as rapidly as desired, but the metal must be cooled very slowly. The longer the cooling time the greater will be the effects of the annealing process.

When heated much above the point of recalescence the grain becomes coarse and the metal is considered burnt. It cannot then be brought back to its natural fineness by the annealing process, or any method of heat-treatment, and is only fit for remelting. In this condition it is filled with microscopic flaws similar to those shown in Fig. 2. The tensile strength of the metal has also reached its lowest possible point, and any further increase in

temperature does not affect it to any extent. The elongation and reduction of area have both decreased until they have practically become *nil*.

The chemical explanation of annealing is that the particles of iron carbide and those of pure iron have been divorced by the heating and cooling of the annealing process. When the metal is hardened these are again brought together, or welded, and form an intimate mixture with a strong cohesive force. When divorced a cutting tool will work itself in between them and pry off part of the metal, but when welded it is not possible for any tool to pry them apart if the carbon content, or other hardening elements, are present in high enough percentages.

Slow cooling furnaces in which to anneal steel are quite expensive and hence other methods are usually adopted to make the metal cool slowly. The most common is that of packing the pieces in an iron box that is lined with fire brick and has a cover that can be sealed with fire clay. This kind of enclosure keeps the air out and gives the atmosphere in the box a reducing rather than an oxidizing effect. The work should be kept in this box until its temperature has dropped to about 550 degrees F., in order to pass the lowest point at which any change in structure occurs. After this there is no danger from air hardening it, and it may be cooled as quickly as desired.

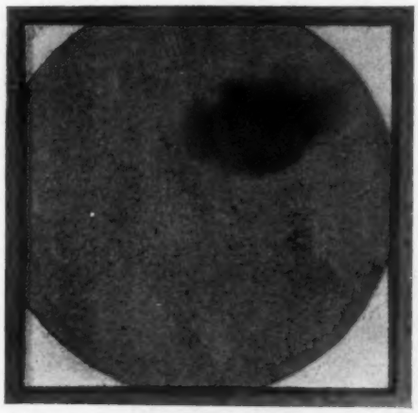


Fig. 3—Further development of flaw started by strains that were not removed by annealing at the proper time

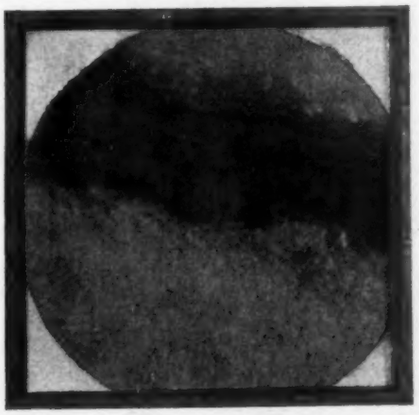


Fig. 4—Flaw developed into a decided crack, failure in service may be predicted for steel in this condition

The steel should be packed in this iron box, in charcoal. The charcoal produces enough carbon to overcome the slight decarbonization that usually occurs in spots on a very thin outer shell of the steel when annealing it. When the surface of the metal is to be turned off this is not necessary, as then the decarbonized part would be removed, but on all pieces where the machine work has been completed it is best to anneal in the presence of charcoal or of some similar carbonizing medium.

To sum up, we might therefore lay down three rules that should be universally adopted in annealing steels. First: A quenched or hammered piece must be heated to a temperature above its highest recalescent point but as close to this as possible. Second: The piece must be held at this temperature long enough to allow the transformation to permeate the entire mass, but it must not be prolonged beyond that. Third: The rate of cooling must be very slow to prevent any hardening from taking place.

Any hardened steel, no matter how hard it may be, will anneal of itself if given time enough. This, however, is a natural phenomena of the metal, and as the time covers such a long period it is of no importance from a practical standpoint.

Economic Engineering

Extracts from a paper read by Roger W. Babson before the Congress of Technology at the Fiftieth Anniversary of the Granting of the Charter of the Massachusetts Institute of Technology. Many good reasons are advanced why courses in economic engineering should be established by the big technical schools.

FUTURE efforts along educational lines should be directed toward training men in economic engineering.

Our nation has grown industrially with great rapidity. We have the largest manufactories, the greatest railroad systems and the most powerful industrial organizations in the world. We unfortunately also have the greatest panics and the most reckless "booms" which are very largely due to the lack of practical economic training in our colleges. Every feature of mechanical, chemical and electrical engineering has been taught in its minutest details; but to the great fundamental factors of trade, upon which the ultimate progress of all our industrial, electrical and transportation enterprises rests, we give only the briefest consideration. For this reason, probably more than any other, although America leads in many industrial, transportation and allied interests, yet we have one of the poorest monetary and credit systems on the face of the globe. Young men are graduated from our universities capable of solving problems in descriptive geometry, least squares and differential calculus; but they are utterly unable intelligently to discuss the fundamental principles of credit, trade and conservation.

Our country has magnificent natural resources, great tracts of iron, copper and other ore, millions of square miles of most fertile fields, great forests of splendid timber, not to mention our water powers, coal deposits and hundreds of other blessings. On the other hand, our people are wasting these resources, misdirecting their efforts and playing at politics simply because college graduates are not thoroughly grounded in applied economics. Our nation is just like a big, healthy boy, endowed with wealth and surrounded with luxury, blessed with a robust constitution, but utterly untrained. We waste our wealth, we misdirect our efforts, we become recklessly crazy during a period of prosperity and shamefully distressed during a period of depression simply because the men at the head of our industries lack sufficient knowledge of applied economics and are utterly untrained in the study of fundamental business conditions. Therefore, a course should be provided whereby the young man must not simply choose between becoming a mechanical engineer or a bachelor of arts, but rather may graduate as an "Economic Engineer" and become a member of the new profession, which shall have for its object the conservation of wealth and the great fundamental principles of applied economics.

Our nation's progress during the next twenty years must be due to something else than our natural resources. Up to the present time our country has grown *in spite of itself* because of what its great mines, forests and fertile fields have produced. Moreover, our products have had little competition and our country has thus far been the only "land of the free and the home of the brave;" and the only land to which the enterprising and industrious European could go to win his way. Now, times are changed, Argentine and the South American countries are becoming great competitors of ours; Japan with the great Chinese Empire is bound to cause us much thought, while Russia, Siberia, Africa and other countries are beginning to present great opportunities.

Therefore, more than ever before this country will need, during the next decade, men thoroughly trained in the fundamental principles of economics; men who will not permit this country to be handicapped either by reckless periods of prosperity or by distressing periods of depression, men who will eliminate unhealthy booms and ruinous panics, men who, graduating as economic engineers in this new profession, will understand the scientific management, direction and development of our great industrial, transportation and banking enterprises.

In the Charging of Electric Vehicles

Mercury Arc Rectifiers Employed Advantageously

Popular conception of the electric vehicle labors under the impression that all that has to be done is to back the vehicle up to a charging station, and in the vernacular of the day "turn on the juice." That there are no formidable difficulties involved it is the purpose here to show. It is the further intention to explain the different forms of electrical energy and to state how the alternating current may be employed for storage battery charging, in the face of the fact that the storage battery requires a direct current.

STORAGE BATTERIES may be properly regarded as reservoirs for energy, remembering that the energy is charged into them by applying an electric current in the charging process, whereby the chemical condition is rendered unstable, so to say, so that in the discharging process the chemical state of stability is restored. Some batteries are made of lead for the positive and negative plates, and oxides of lead as the active material is reduced to the highly oxidic state when the battery is charged and sulphation takes place as the battery discharges, so that the final form of the discharged lead battery is that of lead sulphate as the form which the active material takes. Nickel iron batteries are also employed and the principle involved is precisely the same as in the preceding case, although the actions, in point of detail, differ materially.

In the charging of batteries the practitioner is required to take into account certain conditions that must obtain for the best result. In a lead battery the voltage of each cell connected in series is down to 1.8 volts when the battery is discharged and it rises to 2.6 volts when the battery is on charge as it is approaching what might be designated as full charge. The nickel iron battery has a slightly different range of voltage per cell, but the number of cells are adjusted so that the batteries of the various types, as they are used in electric vehicles, deliver to the electric motors that are used in the propulsion of the vehicles the voltage required by them under operating conditions, so that the charging problem is common to the respective types of batteries.

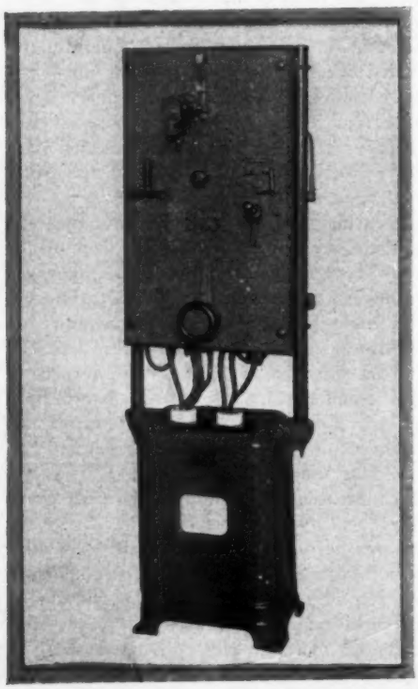


Fig. 1—Runabout type of mercury arc rectifier, showing the front of the panel held by standards which are supported by the transformer

If the reader will understand that the passing of an electric current through a battery reduces the active material to its oxide form during the charge, thus absorbing the energy of the electric current in the process, he will at once reach the conclusion that the current must be passed through the battery in one direction. A direct current traverses its conductors in one direction only, and this type of current is therefore a natural electrical manifestation to employ in storage battery charging. Since the alternating current is, as the name implies, a current of electricity that delivers impulses, alternating in the two directions, it requires no great reasoning power to arrive at the conclusion that this type of current is not suited to the charging of storage batteries, due to the fact that the impulse in one direction will tend to oxidize the battery, which is a charging impulse, and the alternating impulse in the opposite direction will have a sulphating effect, since the battery will discharge during this interval.

In the meantime the alternating current has been employed in the many central stations everywhere due to the fact that it may be transmitted for long distances at a high voltage, and at the point of delivery of the current for lighting and power purposes it may be transformed to a suitable low voltage by means of static transformers. The high voltage of the long distance transmission is essential to the success of the enterprise on account of the vast quantity of copper wire that would have to be used were the voltage reduced, and in discussing the direct current source of electricity it is only necessary to point out that the voltage of the dynamo-electric machine employed must be relatively low, due to the presence on the machines of this type of a commutator whereby the alternating waves as they are set up in the inductors on the armature are interpolated, thus making the direct current. It is not possible to build commutators and apply them to dynamo-electric machines in such a way as to permit of the generation of such high voltages as are common to alternating current dynamos, it being the case that with alternating current machines, instead of employing commutators to interpolate the current, collector rings are utilized instead, thus leading the alternating current from the inductors on the armature to the transmission system beyond with-

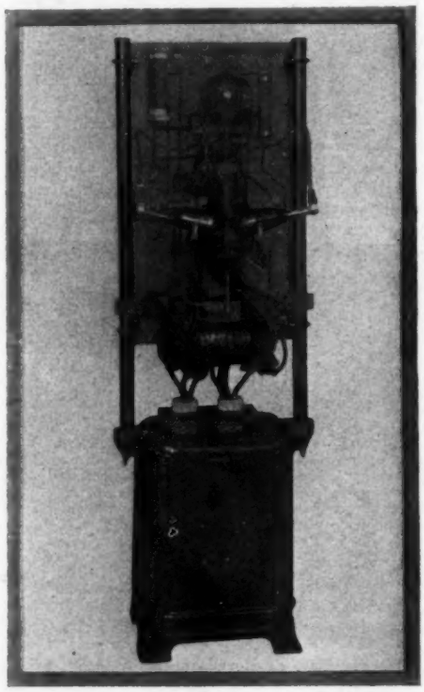


Fig. 2—Rear view of the runabout type of mercury arc rectifier, showing the mercury arc mechanism back of the panel and the connections

out interpolation, hence delivering an alternating current to the transmission, thence to the static transformers, where the voltage is kept down to the level as required by lamps, motors and in the charging of storage batteries.

Mercury Arc Rectifiers Take the Alternating Current and Split Its Phases Producing the Resultant Electrical Energy in One Direction Only, Suiting It to Storage Battery Charging

For purposes of illustration the Mercury Arc Rectifier as manufactured by the General Electric Company is used to illuminate this text, and the difference that exists between the various outfits illustrated are such as experience indicates in view of the various classes of service, ranging from the private garage with one runabout through the more pretentious establishment, ending with commercial charging stations on a large scale, and for commercial convenience the company has made a series of units which are added to each other when it is desired to extend the capacity of the charging plant beyond the ability of a single unit.

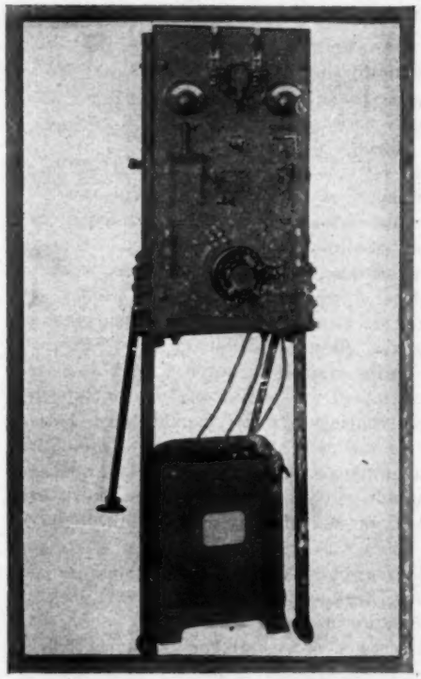


Fig. 3—Commercial type of mercury arc charging unit, showing the standard fastened to the floor and the transformer resting thereon

The runabout type of charging set is shown in Fig. 1 of the front view and Fig. 2 of the rear view. The transformer is used as the foundation of the set and standards extend up from lugs cast on the transformer shell, supporting a panelboard, which may be of slate or marble, upon which are mounted the controlling switches, instruments and other devices by means of which the operator is enabled to work the system, and looking at Fig. 2 the Mercury Arc Rectifier will be seen in the midposition on the back of the panelboard, it taking on the form of an irregularly shaped glass bulb within which a quantity of mercury in liquid form rests at the low point and from which atmospheric air has been exhausted. When the service switch is closed the mercury in the rectifier is permitted to short-circuit the secondary windings of the transformer, with the result that the mercury is in part vaporized, thus discontinuing the short circuit as originally formed, and from this time on in the working of the transformer the electrical energy is transmitted through the body of the mercury vapor so generated, and from this mercury rectifier the electrical energy comes forth bereft of its alternating characteristic, sending impulses in one direction only at the proper voltage through the battery to be charged.

This type of rectifier is designed to operate on a 25 to 60-cycle circuit with a secondary voltage between 110 and 220. The means of regulation are such that the rectifier will accommodate from 15 to 32 cells of lead battery in series, or 25 to 40 cells of nickel iron battery in series, with a maximum charging voltage of 220, and the rate of current will be maximum at 50 amperes, with means for regulating down to 30 amperes as the charging rate. This type of rectifier is in common use in private garages for the charging of the batteries as used in electric vehicles of the runabout, stanhope and brougham types.

The standard commercial battery charging set is so designed that it will work when there is a plurality of voltage available, and one of the advantages of this design lies in the fact that the connections do not have to be changed to suit the various voltages. This type of rectifier is shown in Fig. 3 (front view) and Fig. 4 (rear view). The direct voltage available from this set ranges between 10 and 100 volts when the alternating current on the secondary side is 110 volts. If the alternating voltage is increased to 220 volts the charging voltage beyond the rectifier may be regulated between 10 and 175 volts. This design is normally intended for operation on alternating current circuits from 60 cycles up. It is pointed out, however, by the maker that these sets may be had by special request for operation on circuits of lower frequency than 60 cycles.

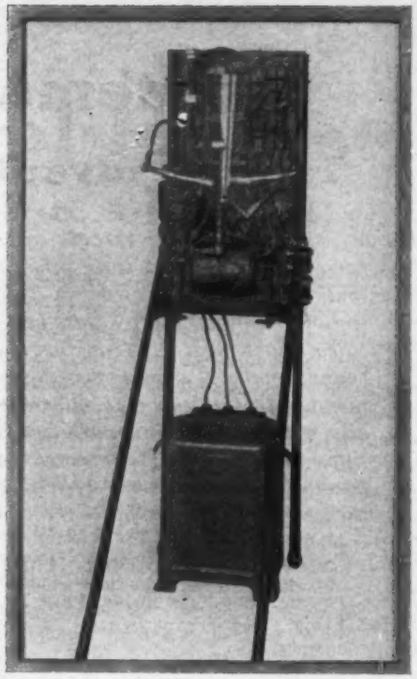


Fig. 4—Looking at the back of the commercial type of mercury arc transformer, showing the rectifier in place back of the panel

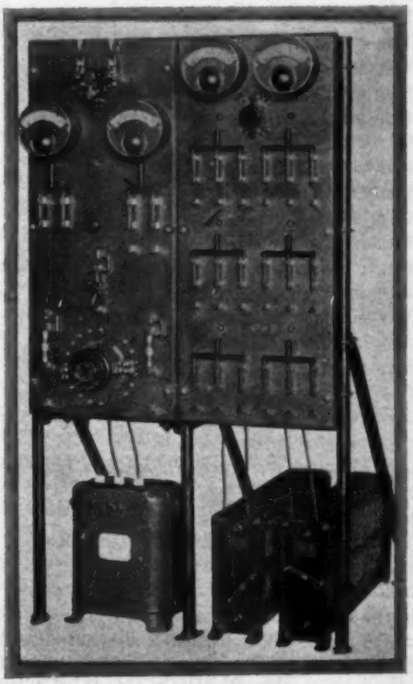


Fig. 5—Public garage type of mercury arc battery charging outfit, showing a double panel, Weston round type measuring instruments, and the switches and other control mechanisms

The public garage unit of mercury arc rectifier is illustrated in Fig. 5, showing a double panel, with round-type Weston volt and ampere meters, and a system of switches that conforms to the more general requirement as it obtains in public garage service. The outfit comprises a feeder panel, to which the charging rheostats are connected, and a rectifier panel, which is similar to the 40-ampere standard battery charging set, but having a voltage range of 45 to 230 volts on the direct current side, when operated from a 220-volt, 60-cycle, secondary side of the alternating current system.

Systematic Trouble Hunting

Taking Advantage of the Process of Elimination

Having presented twelve specific cases, it is the purpose here to continue on citing other cases, it being true that each case represents a fundamental basis of trouble hunting, and by classifying the known quantities make a search for the trouble that is to be found among the unknown quantities. It is recommended that the trouble hunter proceed systematically, making it a point to transfer the unknown quantities to the column of known quantities as fast as investigation affords the desired information, so that by a process of elimination the trouble may be found.

Case No. 13—Motor Runs Normally

If the trouble seems to be in the clutch.
If the change speed lever is free.
If the clutch sticks.

It Stands to Reason That

The clutch sleeve has seized the shaft.
The lubricating condition is bad.
The oil is congealed or gummy.
The chassis frame is sprung, throwing the clutch mechanism out of alignment.
The clutch shaft is twisted.
The clutch spring is broken.
The clutch spring is not tight enough.
The clutch discs are deformed.
The connection to the source of power is discontinued.
The leather facing is worn out.
The leather is adrift.
The motor crankshaft is bent.
The planetary gear shaft is bent.
The clutch linkages are deformed.
The clutch dog is stuck.
The clutch screw is worn out.
The clutch band is too tight.
The clutch housing is deformed.
The motor has shifted relative to the clutch.
The transmission has shifted relative to the clutch.
The clutch movement is interfered with by dirt or other foreign matter.
The foot pedal is bent.
The clutch interlocking device is awry.
The clutch is defective and centrifugal force interferes at high speed.
The clutch faces are worn and the take-up is all in.

Case No. 14—Motor Runs But Is Noisy

If the trouble is in the nature of noise.
If the compression of the motor is moderate.
If the motor runs hot on a retarded spark.
If the motor knocks badly on a long grade.
If the motor knocks when it is heavily loaded.

It Stands to Reason That

The mixture delivered by the carbureter is too rich.
The motor is receiving an excess of lubricating oil.
The lubricating oil used is of poor quality.
The cooling system is in a bad state of repair.
The combustion chamber of the motor cylinders is coated with carbon.

Case No. 15—Motor Runs But Is Noisy

If the motor labors unduly.
If the compression is moderate.
If the lubrication is good.
If the cooling system is working satisfactorily.
If the carbureter is delivering a proper mixture.
If the ignition timing is correct.
If the motor knocks at the higher speeds.

It Stands to Reason That

The piston is loose in the cylinder.
The piston is worn to an elliptical shape.
The piston pin bearing is slack.
The crank-pin bearing is slack.
The crankshaft main bearings are slack.
The crankshaft is bent.
The crankshaft is striking endwise.
The valves clatter due to weak springs.
The valve guides clatter due to strong springs.
The valves and tappets are slack in their guides.
The halftime gear is loose on the camshaft.
The camshaft is twisted.
The timing of the valves is wrong.
The flywheel is loose on the crankshaft.
The clutch is scraping.
The connecting-rod end bearings are striking the lower half of the crankcase.
The lower half of the crankcase is incumbered by the presence of a stray bolt or nut.
The crankcase is not tight and the air wheezes through the joints.
The exhaust manifold is not screwed up tight and exhaust products leak by the flanging.
The conditions of lubrication are imperfect.
The cylinders are not screwed down tight on the upper half of the crankcase.
The fan blades strike the radiator.
The timing system has developed lost motion.
The magneto rotor is interfered with in its rotation.
The flywheel is scraping on the sod apron.
The water pump is worn out and is scraping.
The intake manifold is loose at the flange joints.
The carbureter is too small, producing a carbureter whistle.
The hot-air intake has an obstruction in it.

By-products are always a questionable commodity. In referring to a by-product the thought is uppermost as to whether or not it can be put to any good use, and in the early days of the handling of "crude" as it gushed from the wells of Pennsylvania oilmen were much perturbed, due to the fact that in the distilling process a large part of the crude became as a by-product, leaving but a small portion for utility purposes. The coming of the automobile solved the oilman's problem, by-products disappeared, and as the situation presents itself to-day the lighter distillates are used as fuel, the medium weight distillates serve for lubricating purposes, and the heavy residuum is used as the binding material by means of which the roads over which automobiles roll are rendered the more fit for the purpose. As the situation stands to-day the science of road building has been benefited to a heretofore unheard-of extent, due to the use of binding materials in conjunction with broken stone.

Short Stories of General Interest

Discussing the Economic Side of the Automobile

Why the automobile as an instrument of transportation is indelibly written in civilization is clear enough to the man who takes advantage of its good qualities, but a few pioneer bicycle enthusiasts, having been scarred up in a campaign or two, are overburdened with pessimism, and their eyesight is so poor, under the circumstances, that they have been unable to find an oculist whose skill would seem to match up with their needs. In the meantime, as James G. Blaine said: "Facts are stubborn things, and the hard figures of arithmetic are not to be overcome by airy figures of speech; the truth remains."

PSYCHOLOGY is authority for the automobile as a permanent institution, and this is no more fittingly illustrated than to point out that mechanical transportation is next in line to animal transportation. A few hundred years ago, when women were drawing coal in the mines of Wales, had the mine owners been told that mules would be substituted for women in the course of time, they would have questioned the sanity of the informer. A short half-hour in the study of psychology, however, would have been sufficient to tell these mine owners that mules would be substituted for women, and that they would have to make their drifts with sufficient headroom to accommodate mules, it being the case that women had to crawl on their hands and knees, whereas mules were too stubborn to do so. The world has traversed far since then; the emancipation of the horse is what we are confronted with to-day, and the automobile is the logical candidate, with every reason why it will survive the vicissitudes of time, and do the work that may be legitimately expected of it, economically and well.

* * *

THERMO-DYNAMIC considerations point to the internal combustion type of motor as it is used in automobile work as the highest form of energy transformer that has as yet bowed to the will of man's ingenuity. There are 14,000 British thermal units of heat in a pound of coal, and the average steam engine delivers in mechanical work the equivalent of about 8 per cent. of this energy as it is supplied to steam boilers in the regular course of events, whereas in automobile motors of the average construction, 16 per cent. of the thermal value of the fuel is delivered in mechanical work. This is as much as to say that an internal combustion type of automobile motor, under average conditions, exceeds the thermal ability of the average steam engine by a full 100 per cent, and this is in the face of the fact that the average automobile motor is about one-fifth of the size of the average steam engine. In the long run it is thermal efficiency that counts, and the fact that steam engines are now about at the limit of their perfection, whereas automobile motors are at the threshold of their history, which is yet to be written, makes it possible to call upon the law of probability to forecast a brilliant future for the automobile type of motor, which is another way for saying that the supremacy of mechanical transportation by means of automobiles traversing the highways is assured.

* * *

DEPRECIATION when considered broadly, comparing the horse with the automobile, resolves itself into a simple problem, and the question is, Is flesh more durable than steel? If there is no answer required in this case, then the question is, Are we not better off when we take ore out of the ground, turn it into steel, and with this material build automobiles, by means of which gasoline, also out of the ground, is utilized as a fuel, all for transportation purposes, rather than to utilize our farm lands in the growing of oats with which to feed horses? With the prices of commodities advancing at a terrifying rate, and farm lands being pre-empted on a basis to indicate that there is none too much of tillable soil, who will be so bold as to advocate that we go on gorging 25,000,000 horses when we know that each of them consumes 25 pounds of food every day of his life whether he works or not; when we know, too, that an automobile consumes nothing unless it works? Why should we ask ourselves, in view of all these facts, whether or not the automobile is an economic blunder, or the expression of worth?

* * *

STRANGE as it may seem, there is a very excellent way of comparing the values of commodities with respect to each other that popular conception seems to have missed entirely, and the equally strange point in this connection lies in the fact that the one way of which it may be said the chance of error is very limited, is the device that popular conception fails to appreciate. Potential energy is the exact measure of the value of everything. When we say that a pound of coal contains 14,000 British thermal units of heat, this is a measure of its value. In the same way it is pointed out that a pound of gasoline contains, roughly, 18,000 British thermal units of heat, and this is a measure of its value. In like manner, it may be pointed out that a pound of lean beef contains 730 calories, which is an indication of the value of the beef, and just to show that beef is not the most valuable of the foods, when measured from the energy point of view, peanuts have a rating of 2,560 calories. The real difficulty comes in trying to fix upon the acceptability of the different kinds of fuel in view of the service that they are to render. It is not difficult to reach the conclusion that the 14,000 British thermal units of heat in a pound of coal make good feed for a steam boiler and an indigestible mass for a man. It is easy enough to understand how the 730 calories in a pound of lean beef will suffice for a meal, but the average person balks when he is called upon to subsist upon the 2560 calories that are at home in a pound of peanuts. The point that is to be underscored here, however, will be made when it is understood that it is the energy of the fuel that makes the automobile go, keeps a man alive and reduces the horse to the level of an economic blunder in the light of the service that the automobile renders; but in order to fully appreciate this situation account must be taken of the fact that the food for the automobile comes from the bowels of the earth in the form as deposited there under natural conditions, whereas the energy upon which man and his servant horse subsists is taken out of the ground to the detriment thereof, since it is harder to put back than it is to take out, so that to conserve the energy-giving qualities of the surface of the earth is the right course to pursue.

If alloy steel is to be annealed the time required to accomplish the task is greater than with mild steel.

If the task is not properly conducted the result will be most disappointing to the experimenter.

If the steel is properly manipulated it will be much benefited by the heat treatment.

May 30--International Sweepstakes

Eyes of Automobile World Focused on Indianapolis

The Indianapolis Motor Speedway will see the opening of racing for 1911 on May 30, when the 500-mile International Sweepstakes Race will take place. The event is for Class E, calling for 600 inches or less piston displacement, with a weight limit of 2,300 pounds minimum. The Speedway management offers $25,000 in cash prizes to be divided among the first ten machines finishing the long drive. From information available, there are indications of 38 entries as being assured, with promise of a considerable augmentation of this field. The first car was entered by the J. I. Case Threshing Machine Company, of Racine, Wis.

THREE Case cars in all have been entered by the concern, all of the machines to be alike in construction—of the four-cylinder 318 piston displacement variety. Two Simplex machines have been entered, one by the Simplex Automobile Company and one by Ralph Beardsley. The Inter-State Auto Company has one Inter-State car entered; the National Motor Vehicle Company three cars; the Jackson Auto Company three Jacksons; the Nordyke and Marmon Company two Marmons; the Pope Manufacturing Company two Pope-Hartfords; the Westcott Motor Car Company one Westcott; the Stutz Auto Parts Company one Stutz; Spencer E. Wishart one Mercedes; the F. A. L. Motor Car Company two Fals; Fred. W. Belcher one Knox; Wadsworth Warren two Buicks; the American Locomotive Company one Alco; Edward A. Hearne one Benz or Fiat; the McFarlan Motor Company two McFarlans; David L. Bruce-Brown one Fiat; Dr. W. H. Chambers one Lozier; the Frayer Rickenbacher Columbus Buggy Company one Firestone Columbus; Teddy Tetzlaff one Lozier and the Lozier Motor Company one Lozier; Herbert H. Lytle one Apperson; the Mercer Auto Company two Mercers.

Since the entries do not close until May 1, it is likely that the entry list will reach in the neighborhood of fifty machines. Quite a number of special prizes have been offered by different accessory concerns in addition to the $25,000 in cash to be given by the Speedway management. First prize is to be $10,000; second $5,000; third $3,000; fourth $2,000; fifth $1,500; sixth $1,000; seventh $800; eighth $700; ninth $600, and tenth, $500.

One of the largest special offers to the winners of the first four places has been made by the Findeisen & Kropf Manufacturing Company, of Chicago. This company offers $3,000 with the condition imposed that the winning car be equipped with the Rayfield carbureter. The special purse to be divided four ways—$2,000 to the winner, $500 to second, $300 to third and $200 to fourth.

In addition to the "Rayfield Carbureter Purse" the following offers have been made: Wheeler & Schebler, Indianapolis, $2,500 to the winner, providing the car is equipped with the Schebler carbureter; the Remy Electric Company, of Anderson, Ind., $1,000 to the winner, provided the car is equipped with Remy ignition; the Columbus Lubricants Oil Company offers a "Monogram Oil Purse" of $1,000 divided four ways—$500, $250, $150 and $100—providing this brand of oil is used in the race.

The attitude taken by the accessory companies in giving these special prizes is that the winning car in a race as long as 500 miles has an excellent chance to demonstrate the merits of particular goods, and that while they do not believe that a driver should be persuaded to use any certain accessory through the offer of money that goes with it, they feel that any maker of an accessory which has proven merits is justified in paying a driver extra money providing he demonstrates the value of that particular accessory.

Every minute detail for the all-day battle of cylinders has been arranged and the international event is to be given under the sanction of the Contest Board, and has been given the fullest measure of approval by the Manufacturers' Contest Association. Special permission has been granted by the Contest Board that in case of rain on Memorial Day the race may be postponed until the following Saturday, June 3.

The Indianapolis Motor Speedway has made an offer to an English insurance company as a safeguard against rain. It has agreed to pay $10,000 for a policy worth $100,000 in case it rains sufficiently on May 30 to be forced to postpone the race. This is the first time in the history of automobile racing that such a proposition against rain has been considered as a factor in a race meet, but the magnitude of the venture prompted the Speedway

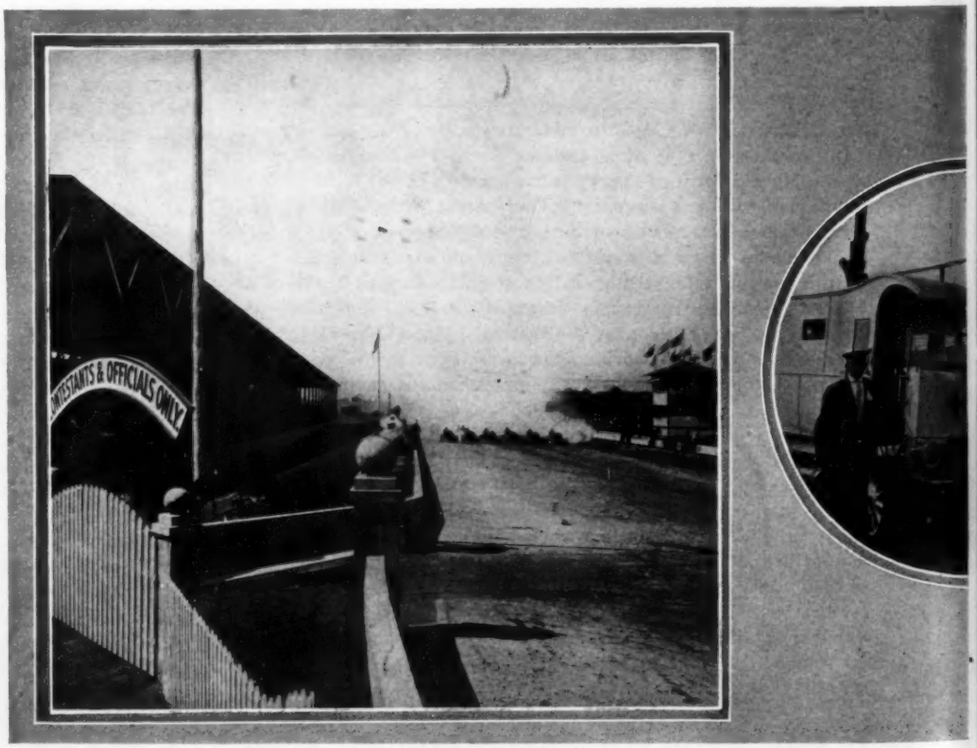


Fig. 1—A typical start, looking from a point in front of the grandstand, showing the wide sweep of the track

Fig. 2—The completeness indicated by the presence Corps

management to consider the probable loss in event the weather is unfavorable.

The track at the Speedway is two and one-half miles of solid brick, ranging in width from forty to sixty feet, and contains practically 4,000,000 bricks. These bricks are of the vitrified variety used in city pavements and covered with cement filler. In order that the exact performance of each and every car entered in the race may be traced from mile to mile, an automatic electrical timing device will be in use, and it will be possible to tell to the hundredth part of a second the exact time it takes for each machine to cover the 500 miles.

In order to give an idea of the magnitude of the Speedway the following facts are worthy of mention:

The complete area of the Speedway is 328 acres and it is located less than four miles from the center of Indianapolis.

There are forty-five buildings, including garages, aerodromes, aviation sheds, etc.

The grand stands and boxes have a seating capacity of 60,000.

There are parking facilities on the grounds for 10,000 automobiles.

The entire grounds will accommodate upward of 200,000.

The turns are banked sixteen feet and have a radius of 1,500 feet.

A cement wall three feet in height by eleven inches in thickness extends around the outer edge of the turns.

The following is a complete list of the entries to date:

Resumé of Entrants as Scheduled

No.	Car.	Pis.	Dis.	Driver.	Entrant.
1.	Case		318.	Strang.	J. I. Case Co.
2.	Simplex.			DePalma.	Simplex Auto Co.
3.	Inter-State.		390.	Baldwin.	Inter-State Auto Co.
4.	National.		447.	Aitken.	National Motor Vehicle Co.
5.	Pope-Hartford.		390.	Disbrow.	Pope Hartford Co.
6.	Pope-Hartford.		390.	Fox.	Frank P. Fox
7.	Westcott.		421.	Knight.	Westcott Motor Car Co.
8.	Case.		318.	Jagersburger.	J. I. Case Co.
9.	Case.		318.	Larsonneur.	J. I. Case Co.
10.	Stutz.		390.	Anderson.	Stutz Auto Parts Co.
11.	Mercedes.		583.	Wishart.	Spencer E. Wishart
12.	Amplex.		443.	Turner.	Simplex Motor Car Co.
12½.	F. A. L.		312.	Pearce	Fal Motor Car Co.
14.	F. A. L.		312.	Gelnaw.	Fal Motor Car Co.
15.	Knox.		559.	Belcher.	Fred. W. Belcher
16.	Buick.		594.	A. Chevrolet,	Wadsworth Warren
17.	Buick.		594.	C. Basle.	Wadsworth Warren
18.	Benz or Fiat.			Hearne.	Edw. A. Hearne.
19.	Alco.		579.	Grant.	Am. Locomotive Co.
20.	National.		447.	Merz.	National Motor Vehicle Co.
21.	National.		589.	Wilcox.	National Motor Vehicle Co.
22.	McFarlan.		248.	Clemens.	McFarlan Motor Car Co.
23.	McFarlan		377.	Adams.	McFarlan Motor Car Co.
24.	Jackson.		355.	Ellis.	Jackson Auto Co.
25.	Jackson.		355.	Cobe.	Jackson Auto Co.
26.	Jackson		432.	Delany.	Jackson Auto Co.
27.	Cutting.				Clarke-Carter Auto Co.
28.	Fiat.		589.	Bruce-Brown.	David L. Bruce-Brown
29.	Lozier.		545.	Van Gorder.	Dr. W. H. Chambers
30.	Firestone-Columbus.		432.	Frayer, Rickenbacher.	Columbus Buggy Co.
31.	Marmon.		445.	Dawson.	Nordyke & Marmon Co.
32.	Marmon.		477.	Harroun.	Nordyke & Marmon Co.
33.	Lozier.		545.	Mulford.	Lozier Motor Co.
34.	Lozier.		545.	Tetzlaff.	Teddy Tetzlaff
35.	Apperson.		546.	Lytle.	Herbert H. Lytle
36.	Mercer.		300.	Hughes.	Mercer Auto Co.
37.	Mercer.		300.	Bigelow, Beardsley.	Mercer Auto Co. Ralph Beardsley.
38.	Simplex.				

Calendar of Coming Events

Catalogue of Future Happenings in the Automobile World That Will Help the Reader Keep His Dates Straight—Shows, Race Meets, Runs, Hill Climbs and Other Events.

SHOWS AND EXHIBITIONS.

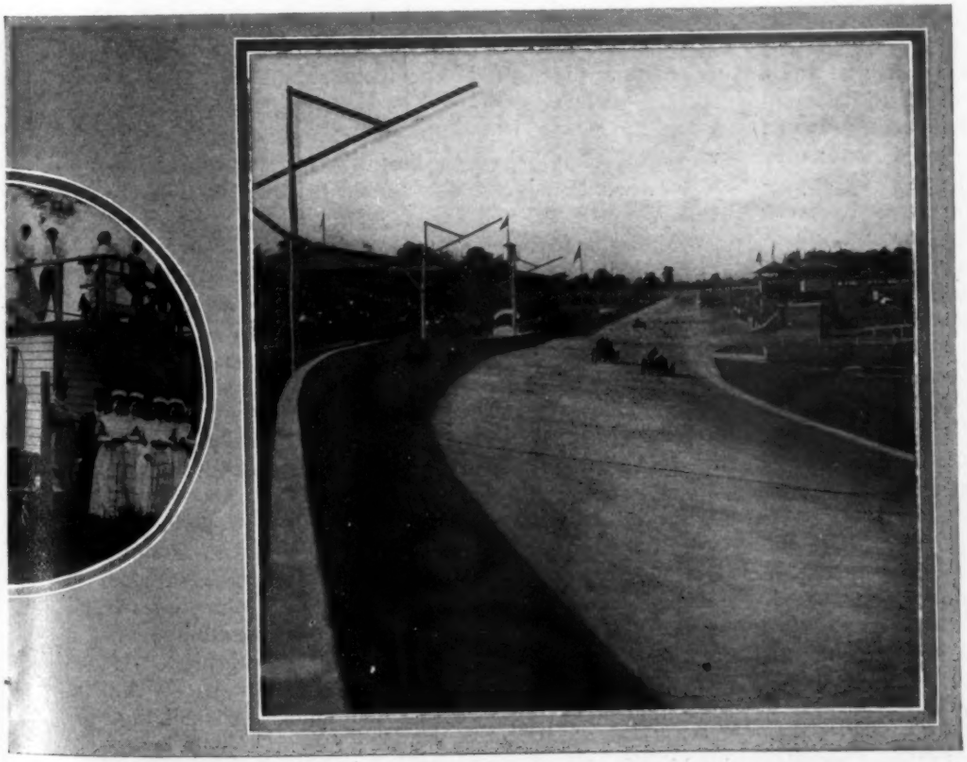
April 26-29.....Utica, N. Y., Annual Show, State Armory.

RACE MEETS, RUNS, HILL-CLIMBS, ETC.

April 20-22.....Lancaster, Pa., Three-Day Endurance Run, Lancaster County Auto Trade Association.
April 22.....New York City, Commercial Vehicle Parade, Motor Truck Club.
April 22.....Redlands, Cal., Annual Hill Climb.
April 29.....Guttenberg, N. J., Track Races.
Date indefinite.....Oakland, Cal., Track Races, Oakland Motordrome.
Date indefinite.....Shreveport, La., Track Races.
April 29.....Philadelphia-Atlantic City Roadability Run. Quaker City Motor Club.
May 16-19.....Washington, D. C., Four-Leaf Clover Endurance Run. Automobile Club of Washington.
May 25.....Chicago, Ill., Fuel Economy Test, Chicago Motor Club
May 27-31.....Chicago, Ill., Five-Day Tour to Indianapolis, Chicago Automobile Club.
May 29-31.....Chicago, Ill., Tour to Indianapolis, Chicago Motor Club.
May 30.....Indianapolis, Ind., Five-Hundred-Mile International Sweepstakes Race, Motor Speedway.
June 15, 16, 17.....Dayton, O., Midsummer Meeting Society of Automobile Engineers.
June 19-25.....Glidden Tour, Washington, D. C., to Ottawa, Canada.
June 22.....Algonquin Hill Climb, Chicago Motor Club.
Aug. 25-26.....Elgin, Ill., National Stock Chassis Road Race, Chicago Motor Club.
Oct. 9-13.....Chicago, Ill., Thousand-Mile Reliability Run, Chicago Motor Club.

FOREIGN FIXTURES.

April 16-23.....Prague, Austria, Annual Show.
April 23-28.....Modena, Itay, Touring Car Contests.
April 25.....Brooklands Race Meeting of M. C. R. C.
May 1-15.....Turin, Italy, Automobile Salon.
May 7.....Sicily, Targa Florio Road Race.
May 14.....Barcelona, Spain, Catalona Cup Road Race.
May 21.....Ries, Austria, Hill-Climb.
May 25.....Meuse Hill-Climb, Belgium.
May 25.....Le Mans, France, Touring Car Kilometer Speed Trials.
May 28.....Le Mans, France, Hill-Climb for Touring Cars.
May 28.....Start of Touring Car Reliability Trials in Germany.
June 1.....Bucharest, Roumania, Speed Trials.
June 4.....Trieste, Austria, Hill-Climb.
June 18.....Boulogne, France, Voiturette and Light-Car Road Races.
June 25.....Sarthe Circuit, France, Grand Prix of Automobile Club of France.
June 25-July 2.....International Reliability Tour, Danish Automobile Club.
July 4 to 19.....Start of the Prince Henry Tour from Hamburg, Germany.
July 9.....Susa-Mont Cenis Hill-Climb, Italy.
July 13-20.....Ostend, Belgium, Speed Trials.
July 21-24.....Boulogne-sur-Mer, Race Meet.
Aug. 6.....Mont Ventoux, France, Annual Hill-Climb.
Sept. 2-11.....Roubaix, France, Agricultural Motor Vehicle Show.
Sept. 9.....Bologna, Italy, Grand Prix of Italy.



of the arrangements is of the Speedway Hospital

Fig. 3—General view of the home stretch, showing the protecting cement wall, banked curve and the safe position of the spectators

THE AUTOMOBILE

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ACCIDENTS, although they are at a marvelously diminishing rate, considering the fact that there are nearly 500,000 automobiles in use at the present time, are due, in over 50 per cent. of the cases, to bad roads and high speed considering the road conditions, and for the rest they must be charged up, in some proportion as yet to be determined, to inferior road wheels, defective steering gear, ineffectual brakes and the inharmonious relations of parts in conjunction with motors of high power. Confining attention to the problems involved in the making of automobile wheels, it is striking how good they are in the main, and to what depths they fall on occasions when quality is thrust aside and low price is the sole aim. How an automobile builder can bring himself to the use of wheels with the spokes of wood that has no ancestry, and so made by a machining process that the "bastard" variety of spoke is in such presence that the scattered few of these members of excellent characteristics have to be sought for to be found, is hard to understand. Against this poor practice is the custom of casting out "bird-pecked" wood, which may be perfectly strong, so that a waste is created when this wood is thrown away, and in like manner "heart" wood is too often separated out, notwithstanding the good qualities that may be seen in it at a glance by a wheelwright of skill and discrimination. It is this property, which may be set down as the sense of discrimination, which is wanting in the wheel-making business, and which too often seems to be supplanted by a sense of high disregard of the safety of the users of automobiles and the public at large.

* * *

INVESTIGATION, especially as it relates to automobile motors, seems to be never-ending, and the investigators are being rewarded in the fullest proportion to the energy they apply in this rich field of endeavor. It was only the other day that some automobile engineers in France took a peek behind the scenes for the purpose of finding out the difference in the temperature of the flame-swept walls of the cylinders as compared with the water-washed exterior walls in juxtaposition to the heated surfaces within. These investigators found, of course, that there was a great difference in the temperature, and that there were marked variations, comparing temperatures during the four cyclic periods. There was one point that the investigation clearly showed, which, however, they failed to mention, disclosing the reason why automobile motors serve more efficaciously than other types of motors. The walls of the cylinders of automobile motors have been made thin to reduce weight. The walls of the cylinders of stationary motors were left thick, because weight was no object. Under working conditions, it has long been appreciated that stationary motors heat up badly if the speed is increased beyond a certain point and if the compression is advanced accordingly. In automobile motors there has been very little or no trouble of a thermal character on account of increasing speed and the high compressions that obtain, and the investigation, to which allusion is here made, would seem to indicate that the thin walls of the automobile type of motor perform a service that designers have taken little, if any, note of. It would appear that heat does not traverse the cylinder walls fast enough to satisfy the conditions in high speed work if the walls are thick, and so it may be said if a motor is to operate at high speed its walls must be thin.

* * *

TOURING as a pastime bestows enjoyment upon the owner of a good automobile in proportion as he displays prudence, and this is, perhaps, the underlying principle of enjoyment in all walks of life. Touring on a scientific basis, however, must be classed as a new art, it being the fear that enjoyment of this character in the past has been peppered by a certain amount of chance, due to the absence of a proper display of science; and if science may be described as classified knowledge, the application of this principle to touring puts it at once in the category of classified touring. It is classification that is wanted, and the indications are that this necessary undertaking will be specialized just as book-keeping is a specialty in mercantile houses, and the proper treatment of the touring subject in the hands of men of skill, resulting in the compilation of data for ready reference and the Baedekerizing of routes, including booking ahead, must end in enjoyment without undue responsibility on the part of those who participate in the enterprise. If there has been any complaint in the past it was on the score that long tours carried too much responsibility. Let us have our touring master; the man with broad shoulders and compact intellect, with accentuated skill—let him take the responsibility.

Reeves, Sales Manager U.S. Motor Co.

A. L. A. M. Executive to Head Big Selling Force

Laying aside his duties to the A. L. A. M. as that organization is about to pass out of existence, Alfred Reeves, general manager of the licensed body, has accepted the important post of general sales manager of the United States Motor Company and will assume charge of his new work on May 1. Mr. Reeves is one of the most highly regarded men in the industry and has been a power in it since 1906, when he became manager of the A. M. C. M. A. He has been in his present position since the first sweeping Selden decision in September, 1909.

ALFRED REEVES, one of the leading figures in the national automobile industry and for more than a year general manager of the late A. L. A. M., has been appointed general sales manager of the United States Motor Company and will assume his new duties on May 1.

The history of Mr. Reeves in connection with the development of the automobile is a landmark of the industry. He first entered the field in 1899, conducting the automobile department of the New York *Evening Mail* and later went to the *Globe*. After achieving success in that line he branched out as a promoter and in the next few years had charge of numerous meetings at Empire City, Morris Park, Brighton Beach and Atlantic City.

In 1906 he became manager of the A. M. C. M. A., where he remained until after the rendition of the first Selden decision, which upheld that patent and caused all of the members of the association to join the licensed organization with the exception of the Ford Motor Company.

This decision was handed down in September, 1909, and after consultation with the members of A. M. C. M. A. and with the advice of Henry Ford, Mr. Reeves accepted the appointment as general manager of the licensed body.

The A. M. C. M. A. was liquidated and something like $60,000 which was in the treasury at that time was distributed. Under his guidance the annual shows of both the organizations with which he has been connected proved progressive successes.

In his new position with the big sales company Mr. Reeves will have general charge of the marketing of the Maxwell, Stoddard-Dayton, Columbia, Brush and Sampson lines and the motor and accessory products of the constituent companies of the United States Motor Company.

Mr. Reeves will have no successor as head of the A. L. A. M. as that organization is about to lose its identity in the Automobile Board of Trade, which was incorporated at Albany last week. The head of the new concern has not been selected and before such a choice can be made the matter will have to be formally voted upon by the members.

Traffic Department of the N. A. A. M. Discusses Freight Classifications

The enormity of the traffic problem as it confronts the makers of automobiles is scarcely to be appreciated by shippers of other goods, and owing to the continued activity of James S. Marvin, general traffic manager of the association, the conditions that get in the way of success are being alleviated. There was a session on April 11 for the purpose of urging a division of the classifications, laying particular stress on carload lots, discussing the commercial vehicle shipment problem with a view to obtaining proper recognition. Mr. Marvin contended that the present classification is founded entirely upon conditions as they surrounded the automobile business some six years ago. That there has been a considerable change in the attending circumstances within six years is a matter that should be well appreciated, and it is regarded as a source of much regret that the railroad companies have not as yet seen fit to make special provisions for the handling of freight automobiles. When it is taken into account that nearly 10,000 freight cars were used in the shipment of automobiles and parts at Detroit alone in January, February and March it is not asking very much in presenting these matters to the attention of the railroads. Among those present were:

W. J. Gordon, Anderson Electric Car Co., Detroit; C. W. Eggers, Willys-Overland Co., Toledo, O.; John A. Moore, U. S. Motor Co., New York; H. S. Stebbins, General Motors Co., Detroit; A. C. Westfall, Cadillac Motor Car Co., Detroit; C. J. Shaar, Packard Motor Car Co., Detroit; W. L. Haskell, Stevens-Duryea Co., Chicopee Falls, Mass.; C. D. Holmes, H. H. Franklin Mfg. Co., Syracuse, N. Y.; C. B. Armstrong, Hudson Motor Car Co., Detroit; H. R. Moule, Chalmers Motor Co., Detroit; A. B. Hastings, Pope Mfg. Co., Hartford, Conn.; C. L. Warner, Locomobile Co. of America, Bridgeport; W. M. Young, Nordyke & Marmon Co., Indianapolis.

Editor Beecroft on Vacation

David Beecroft, Managing Editor of *Motor Age*, and his family sailed for Europe Wednesday afternoon on the Lusitania of the Cunard line. Mr. Beecroft will remain abroad for a vacation of five weeks.

No More Franklin Yearly Models

SYRACUSE, N. Y. April 17—The H. H. Franklin Manufacturing Company has formally announced that in future there will be no more yearly models of Franklin cars. Cars of this and other years will be known by their year numbers, but there will be no 1912, 1913 or succeeding years that will be so designated in the output for those years. According to the management there will still be changes and improvements in the Franklin cars of the future, which will be duly recorded, but the arbitrary lines that separate one season from another will not be dignified by a so-called change of model each year.

Alfred Reeves, Sales Manager United States Motor Co.

Scientific Touring Is the Theme

American Scenery Balm to Restore Nerves

GETTING the measure of enjoyment and profit out of an automobile that is suggested by the purchase price and the cost of maintenance is the problem that confronts the automobilist. The automobile art is based upon a foundation that is so sound in its inspiration that the automobile industry has surpassed all other activities in America, and within the measure of a decade the industry has traversed from the foot of the class to the position of third from the head. Strides like these must be measured on the tape of merit, and the men who are unable to recite the reasons for this splendid progress must be either too busy enjoying the automobile, too dull to take advantage of its presence or too poor to own one.

Axenstrasse Gallerie, near Brunnen, on the Lake of Lucerne.

Summit of the Furka Pass, near Lucerne, Switzerland.

When the automobile was young, and somewhat restricted in its capabilities, the radius of discreet travel was well within the stamina of a well-bred horse pulling a road wagon, and novelty, coupled with neighborly envy, not forgetting the salesman's propensity for acquiring success, was uppermost; but within a year or two the underlying advantage of the automobile crept from its tangled hiding place, surpassed the horse in real service and the problem of how to enjoy a natural advantage was placed on the blackboard of the automobilist for him to solve.

It was at first thought that the best way to get work out of a car was to take a company of capable machinists along and keep one eye on a convenient horse. Superstition, like the measles, has its run; the things that the automobilists feared most happened least, and while it is not to be controverted that pioneers are in a position to relate some sad and ludicrous tales of what was once regarded as woes, even so experience was what they needed, and it was one of the advantages of the early makes of automobiles that they afforded just the experience desired.

The Formation of Automobile Clubs in the Various Centers Was the First Measure for Concentration, Making the Voice of One Man Equal to That of the Club Membership

The problems of the makers of automobiles were reduced in complexity with experience, due to the relation which exists between the undertaking of tasks on a large scale and the automaticity that becomes the property of the workman who repeats a given operation many hundreds of times. But as the makers' problems bowed to the logic of repetition and growing facilities the users of cars have found themselves the victims of an adverse public opinion that seemed to increase as dogs barked and horses shied, much as if the strange performances were catching, particularly by the representatives of the law. Users reached the perfectly good conclusion that club relations would be a good foil for undue pressure in response to prejudice. Moreover, it was the opinion that by forming clubs the automobilists would be able to improve their social intercourse, obtain better terms for accessories and other needs, be able to contrive maps and gather touring information, and by the building of club houses realize a meeting place that would have the added advantage of a club garage, thus lowering the cost of keeping cars and bringing the questions of repair within the influence of the men over whom the automobilists would have direct influence.

The club situation grew and prospered and it is one of the institutions in every metropolitan community, and few indeed are the relatively small towns that cannot boast of an automobile club with an enthusiastic membership, and the program that is far-reaching in its influence upon the ramifications of the automobile.

In the Light of Present Knowledge There Must Be a Way by Which Automobilists Everywhere Will Be Enabled to Work Together with a Definite Object in View

A jarring note came into the club life of these enthusiastic automobilists when they essayed to get out touring information and maps and to obtain favorable rates from hotels. In view of the considerable distance that may be made in an automobile in a single day, considering the feasibility of crossing from the Atlantic to the Pacific within a couple of weeks, it was soon discovered that even an ambitious effort at improvising touring information was to no purpose.

A map is, of course, of no value at all, due to the impossibility of imparting information sufficiently detailed in character to enable an automobilist in a strange country to identify his location; nor is it necessary to enlarge upon the fact that a map is unwieldy. Even the larger clubs in the metropolitan centers, while they struggle as best they can with a difficult situation, are exceeding their club prerogative, and launching into a phase of the automobiling problem that might best be handled by a centralized body, thus making the one effort available to all and reducing the cost of doing the work to a point where the quality of the effort will be in keeping with the need. But all of these matters have been struggled with for nearly a decade, and the men who have paid for their experience are

Telling how new blood among the users of automobiles is taking advantage of the good qualities that are normal to automobile propulsion, pointing the way for the American citizen to enjoy the beauties that Nature bestowed upon the American continent, sparing him the necessity of going abroad in quest of rest and recreation, discountenancing the further cheeky efforts of those who pose as the friends and representatives of automobilists, only to feed upon them, and to fester in the body politic of the men who pay the bill. It is suggested that the drawing power of scenic conditions in the United States will be at once apparent to the man who feasts his eyes upon a few of its good examples, and that balm to restive nerves is indigenous in native air.

quite alive to the futility of trying to do the impossible. What is needed at the present time is a scientific analysis of the situation, and activities such as will bring about, not necessarily a reform, but an advance to accord with the lesson that experience gives.

There was a time when it was believed that this important phase of the automobilists' activity would be satisfied through the coalescing of the clubs with sporting fraternities, but this was a great mistake, and the men who have to foot the bill now know that the normal life of the owner of an automobile has nothing to do with racing, and that any money he pays for the privilege of supporting a racing body is money lost.

To the automobilist who merely desires to own a car for the purpose of taking him from his residence to his place of business and back and for the convenience of his family in the interim, there is little of interest in the exploits that the great body of automobilists enjoy, so that any plan that may be contrived in the future must be by those who have experience along broader lines, and who have in mind the specific needs of automobile tourists.

Joining Hands for the Purpose of Facilitating the Enterprise Has the Further Virtue of Giving Insurance of a Suitable Character at a Time When It Is Most in Need

The pleasures of touring, however much they may be intensified by the splendid performance of a good automobile and happy surroundings, are too frequently marred (a) by the character of hotel man who cannot bring himself to a realization of the fact that a fair price is all that he is entitled to for his accommodations and viands; (b) the high price that is charged for a mixture of gasoline and water, and the fact that there is no excuse for giving short measure in view of the low price at which water may be had; (c) the ease with which the sense of direction is dispelled in a swift-moving automobile; (d) the puzzling nature of ill-contrived maps, and the poor information they impart; (e) the persistence with which the "natives" misdirect an inquirer; (f) the premium that has to be paid for a minor repair at a wayside garage, and (g) the price of a tire if it is purchased from a stranger in the next county, who is after the almighty dollar.

Instead of each club all over the country trying to protect its members outside of the zone of its proper influence, it would be more efficient were the clubs to support a central touring body, thus saving to the clubs the enormous cost of individual effort, and gaining by the clubs the good that comes through the office of a strong central body.

The Time Has Arrived When Tours Should Be Organized for Long Treks, Taking in Points of Historic Interest with Scenery Painted by Nature, of Which Illustrations Are Here Afforded

There must be a want before it can be filled, and the want of good hotels has been taken care of, and it merely remains for the automobilist on his tour to know a good one when he sees it; in the same way a good garage may be recognized, and in like manner a good road is to be had for the asking. If the automobilist is touring in the vicinity of his own residence these good things will be within the range of his memory, but as he departs from the landmarks that are familiar to him the complexity of the situation becomes the more apparent, and wisdom whispers "go down to the club and obtain the requisite information for the intended enterprise."

There is no reason why a party of automobilists should not be organized and equipped to travel as far as the Pacific Coast, taking in the points of interest that would delight a "Baedeker"; pausing as fancy dictates, on a leisure basis, pronouncing a benediction after a timely repast at some old "Revolutionary Inn"; becoming acquainted with the lord of creation in the garb of a farmer as his wife dispenses the products of the dairy to the members of the caravan; visiting the scenes of former conflict, where the goddess of war once upon a time held sway, and entering mountain wilds, keeping the towering peaks in view, with convenient pauses as the exigencies of the tour might indicate.

But none of these happy thoughts are possible of realization in the absence of due preparation, or outside of the pale of effective management, such as the Touring Club of America proposes, using the Automobile Blue Book for the purpose. It is of no value to traverse a district unconscious of the historical surroundings, and is is a high testimonial to Baedeker that his idea of tersely putting history in the guide book has been extended, telling the traveler from afar of the things that happened in each locality, whetting the interest and imparting education, thus giving to the sojourner not only the pleasure of a visit to distant scenes, but an indelible impression of matters of human interest to be taken back home and utilized as the tools by means of which the activities of afterlife are to be broadened and amplified.

Where the Western Pacific crosses the Feather River, near Belden

Salmon Lakes and Sierra Buttes on the W. P. R. R., near Blairsden, in America

Looking Backward

For many years one of the annual features of Gotham has been the Easter morning parade of foremost citizens afoot and astride, with a sprinkling of smart vehicles current of the times, and the illustrations here given, one of which was taken in 1907 and the other last Easter morning, afford the opportunity to glance over the right shoulder and see what time has wrought.

DOUBTING THOMASES, of which the world has always had a heaping measure, learn but slowly by experience, never believe what they hear, and discount by half what they see. To tell one of these respected citizens that there are over 40,000 automobiles running in the city of New York alone, and that they have displaced three times 40,000 horse-drawn vehicles, means very little to him. Moreover, he is utterly incapable of understanding why three horse-drawn vehicles would be displaced by one automobile, and yet the fact remains. Fig. 1 is a half-tone reproduction of a photograph that was taken in 1907 on Easter morning, showing the "hat parade," and the street very much dotted by horse-drawn vehicles, with a sparse four automobiles in sight. Comparing this illustration with Fig. 2, it will be seen that the "hat parade" was quite as conspicuous last Easter day as it was in 1907, but the street is occupied by automobiles, almost to the exclusion of horse-drawn vehicles, of which only six are to be seen.

Connecticut Legislature Active in Automobile Matters

The latest report from the scene of the Connecticut Legislature tells of a bill that has been presented to the Legislature by the Connecticut Automobile Association. Provision has been made in this bill for non-resident automobilists who visit Connecticut, exempting them from taxation for a period of 60 days, provided they have met the requirements of the automobile laws in their home State.

In a substitute bill that has been reported by the committee, the 60-day privilege shrunk to 10 days, and then only to States that grant an equal privilege. It is presumed that the committee had in mind the forcing of States like New Jersey to deliver a fair measure of reciprocity. It is a great misfortune that the committee in generously disagreeing with cramped legislation as it obtains in New Jersey should see fit to follow the same bent. Account should be taken of the fact that the people who are most affected by this stringent form of legislation are not those who pass the laws, and are innocent victims of a set of circumstances over which they can have no possible control, and in discommoding them, it is at an undue loss to the State of Connecticut in many ways. Moreover, automobilists from other parts of the Union are deprived of a real pleasure in that they will not enjoy traveling over the splendid roads of the Nutmeg State, and the scenery which is nowhere better.

This would be a splendid time for the Connecticut legislature to treat with the automobile subject on a broad and comprehensive basis, and to set a good example to New Jersey and other lagging States, whereby the automobiling citizens from adjoining States might be welcomed and entertained with freedom from harassing legal restrictions that can only end in a loss to the visiting automobilists intellectually and to the citizens of the State of Connecticut financially. Should the Legislature persist in pushing its substitute proposition, the citizens of Massachusetts, for instance, which State grants but seven days to non-residents, would be deprived of all privilege under the new proposal, and surely this cannot be looked upon as wise legislation, particularly when account is taken of the fact that if the automobilists of Massachusetts cannot sojourn in Connecticut without paying a high automobile tax, the citizens of Connecticut will labor under an equal disadvantage, since they will be deprived of the privilege of crossing the Massachusetts State line unless they pay the full tax under the reciprocal clause of the law of the State of Massachusetts.

Fig. 1—Easter Parade on Fifth Avenue in 1907, showing parading pedestrians and many horse-drawn vehicles, with only four automobiles in sight

The citizens of Connecticut, from all accounts, do not seem to look with favor upon the substitute bill of the committee, and opposition to this measure seems to be so general in its distribution, involving such a wide range of Connecticut's foremost business men, that it would seem impossible that the committee will find it wise to persist, and the automobilists in adjoining States, who, if they sojourn in Connecticut, pay for the goods and the accommodations that they receive, are strong in their expression of the hope that the Connecticut Legislature will lead in the liberality of its treatment of invading automobilists, rather with the expectation that in the long run a certain uniformity will obtain along legislative lines involving automobiles in all the States of the Union.

Showing 4,000 employees of the Willys-Overland Company who were given a holiday on April 12, and who went in a body to help open Toledo's baseball season, this being the second annual event of the kind as instituted by John N. Willys in the propagation of the "family spirit" that permeates the building of automobiles under this progressive management

Maryland Plans Road Improvements

BALTIMORE, MD., April 17—Spring road work is being started by the State Roads Commission, which contemplates the construction during the coming year of 200 miles of improved roads, connect-

ing many disjointed sections in the State. It is also proposed to make the first expenditure of the $1,000,000 loan authorized by the last General Assembly for the building and purchase of bridges.

The first new bridge will be that over the Nanticoke River at Sharptown. It is expected that a similar amount will be expended on road construction. It is further expected that the Clarksville turnpike will become the property of the State within the new few weeks. Negotiations are still pending for the purchase of the Baltimore-Westminster turnpike.

Members of the commission hope by the end of the year that there will not remain a single tollgate in the State. Negotiations for the rights of way for the Baltimore-Annapolis boulevard are approaching final adjustment. It is expected that the boulevard will be completed by Jan. 1.

A Case of the Spigot and Bunghole

Editor THE AUTOMOBILE:

I have seen it stated that the Honorable Secretary of State claims that by adding an express tax to the State tax on automobiles he is saving the State $20,000. It would greatly interest me to know by what possible method of bookkeeping he is able to figure this out.

Fig. 2—Easter parade on Fifth Avenue in 1911, depicting pedestrians galore, many automobiles and a sparse six horse-drawn vehicles.

The express tax on 60,000 tags at 35 cents each is $21,000. Good. But in order to make the distribution he has had to organize a special express company with rentals and clerks and cartage and freight and cartage in Albany and clerks and porters to sort and pack the tags for their respective territories. All of this work would have been done by the express companies for a private individual probably for a flat rate of 25 cents each or $15,000 for 60,000 tags.

Of course I have no figures and they probably will not be produced but I think it is a safe bet that the system used this year has cost the State at least twice 25 cents for each tag already sent out and probably four times that for those sent out for the balance of the year.

However, this is on a par with the $1.25 that it costs the State to issue renewals of chauffeurs' licenses. H. R. H.

Staatsburg, N. Y.

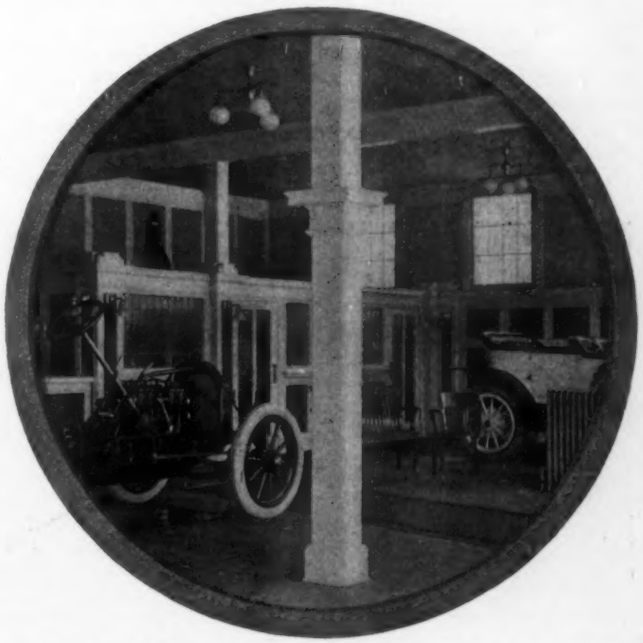
Colonels to Build "Lincoln Way"

LOUISVILLE, KY., April 17—Plans for building the "Lincoln Way" from Louisville to the old home of Abraham Lincoln in Larue county and the reconstruction of the old Louisville and Nashville pike from Louisville to Nashville, took definite shape at a meeting held in Elizabethtown recently. Never before in the history of the good roads movement in Kentucky has there been held such an enthusiastic gathering and more than 700 citizens, many of them motorists, from the counties of Jefferson, Hardin, Larue, Simpson, Warren, Hart, Barren, Edmonson were present to pledge themselves to carry out any plans made at the conference.

The sentiment of the meeting was largely in favor of a cooperative effort to rebuild the pike in one day. While no date was fixed by the delegates it is likely that August 15 will be selected as the day on which to finish the project.

Premier Opens Indianapolis Branch

ILLUSTRATIVE of local activities among makers of automobiles, reference is made to the new Premier local branch at Indianapolis, which is the home of the Premier Motor Manufacturing Company. The scope of the new undertaking will be appreciated by studying the illustrations here given. The new building is on the main motoring thoroughfare, North Delaware street, and in addition to making extensive alterations to the building it was most tastefully decorated in the manner as shown. The Premier Sales Company, which is a separate concern, conducts this part of the Premier business, but as a matter of convenience the factory sales and advertising departments are moving into the new establishment. The building is 125 feet deep by 66 1-2 feet wide, and has been divided into four sections, namely the display room in the front, the office of the local and factory forces, a small garage for demonstrating cars, and a large garage for storing purposes. The front of the building has been provided with large windows, and the excellence of the lighting effect is due to a profuse distribution of tungsten lamps. The display includes five cars, and to the back of the salesroom there are three private offices, which, like the display room, are finished in mahogany and are enclosed in stained glass set in white enameled paneling. One office is occupied by President H. O. Smith of the Premier Company; R. W. Macey, manager of sales, occupies another of these offices, and the literary department, under the direction of W. McK. White, will be found in the remaining office, which also affords accommodation to John B. Orman of the sales department. The friends of the company, of which Indianapolis has a large contingent, express high appreciation of the manner in which their needs are being attended to. This advance is also a good indication of the condition of the automobile business in Indiana.



Interior view of Premier salesroom in the New Branch that has just been opened at Indianapolis.

Gorton Meets with Fatal Accident

W. S. GORTON, one of Cleveland's foremost citizens, whose commercial life was interwoven with the Standard Welding Company, holding the position of secretary and general manager, met with a fatal accident while returning from luncheon to the works in his automobile. According to the meager information available Mr. Gorton was overtaken by a Lake Shore train, striking his car, resulting in fatality, which it is our sad duty to record.

The late W. S. Gorton.

As an official and member of the National Associaton of Automobile Manufacturers Mr. Gorton made his mark by his wise counsel and unselfish activity, and his voice has been heard at the meetings of the A. L. A. M. and his counsel has been heeded in the affairs of the M. & A. M., while those of the Society of Automobile Engineers who will remember a sojourn headquartering at Cleveland, with visits to the principal Ohio industrial centers, will scarcely forget how energetically and gracefully Mr. Gorton served as the initial member of the committee who conducted the affairs at that time; but these are all mere illustrations of the many incidents in his busy life, which entered into the automobile business at its early inception, taking the lead in many important endeavors, and a prominent part, with shoulder to wheel when co-operation was of the first importance.

Mr. Gorton was 52 years of age, and leaves a wife and four children.

Roads in Virginia Not So Good

A telegram received this Tuesday announces the safe arrival of a party of trans-continental tourists in Atlanta, Ga. They state that the roads are very bad below Staunton, Va., with mud about two feet deep, it being a case of plow all the time. The party consists of Brandon Hendricks, 153 W. 75th St., G. L. Ball, 229 W. 105th St., New York, and Howard W. Coffin, El Paso, Texas.

They are driving a "50" Simplex, and will follow the southern route through Texas, New Mexico and Arizona as outlined in the "1911 Automobile Blue Book." Incidentally the tourists state that so far the route is errorless, as given. It is the intention of these gentlemen to return via the northern route in the Summer, and they will furnish the Blue Book with notes of their return trip. They are carrying the flag of the Touring Club of America.

Squeegees to Clean New York Streets

MILWAUKEE, April 17—New York City's residence streets will soon be cleaned and flushed in the most modern manner known. The Kindling Machinery Co. of Milwaukee has been awarded the contract for furnishing 150 Kindling street cleaners and flushers to the street department of New York.

These machines have been in use in Milwaukee for several years and Mr. Kindling has succeeded in having the type adopted at Berlin, Germany. The machine is of the squeegee type, with a water tank feeding into a rubber roller in the form of a spiral disc. The machine is best adapted for asphalt pavements.

McIlvain Resigns from Pennsylvania

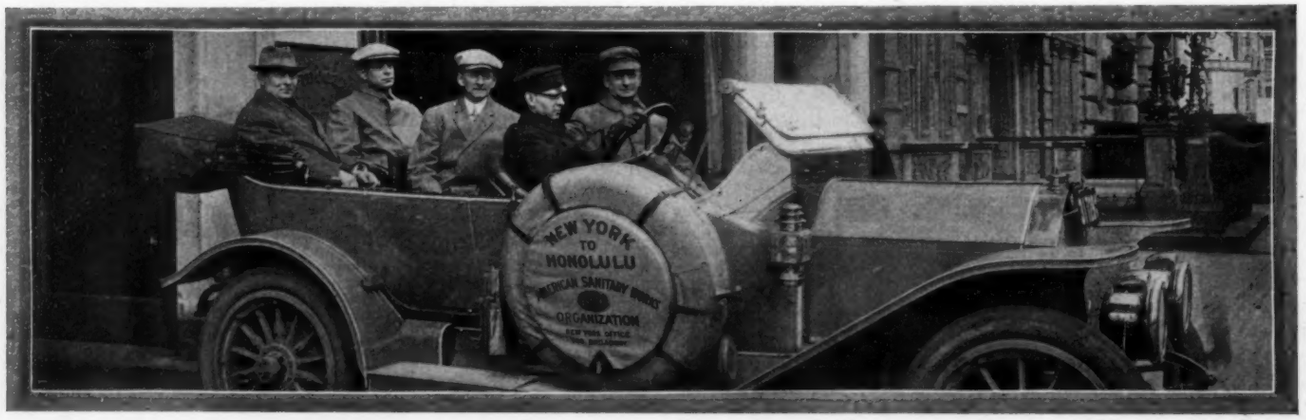
BRYN MAWR, PA., April 18—Charles J. McIlvain, Jr., who has been president of the Pennsylvania Auto-Motor Company since its inception more than five years ago, has resigned, and an entirely new board of directors has been selected. This move is in accordance with the policy of the company to enlist new capital and blood in the enterprise. The announcement of the personnel of the new board and officers will be made within a month. Tom Moore has accepted an important position with the company and will be located at the factory in the near future.

William B. Hurlburt, for the past two years manager of the New York branch of the E. R. Thomas Motor Company, has been named as President of the Pennsylvania Auto-Motor Company and will assume his new duties on May 1.

Senator to Build Model Road

MILWAUKEE, April 17.—United States Senator Isaac Stephenson of Marinette, Wis., millionaire lumberman, has entered into the spirit of the good roads movement in Wisconsin and will spend $30,000 to prove that his interest is real. The expenditure will be directly in line with the movement started at Milwaukee to build a model highway from Milwaukee to Chicago. The route runs through the immense stock farm of Senator Stephenson, near Kenosha, Wis.

The superintendent has been instructed by Mr. Stephenson to build a mile and a quarter of model road and experts in road building have been employed to take charge of the work. Said Senator Stephenson: "I don't want this road to be 'fussy' or out of the reach



Sanitation experts who will travel 25,000 miles by automobile on an educational campaign, making double transcontinental trip and tour of Hawaii. Front seat, B. O. Tilden, president of American Sanitary Works; driver, Lief Bernhardt. In tonneau, J. M. Tilden, secretary American Sanitary Works; John P. Seiler, Eastern manager; W. A. Cawley, Western manager.

of the ordinary farmers in the neighborhood, but I want it to be the best possible road that can be built under the circumstances. I don't care what it costs, if it will only stand as an example to the farmers in Kenosha county." The road will be of macadam and will be completed by Fall. In addition to giving $30,000 for this piece of model road Senator Stephenson has agreed to assist his neighbors in a substantial way to continue the good work he has taken up.

Jersey Solons Seek Reciprocity

TRENTON, N. J., April 18.—Efforts to secure the passage in the State legislature of a bill wiping out the power of attorney from the statute books have been abandoned and Senator Prince last night introduced a new automobile reciprocity bill. It is generally predicted that the measure will pass.

The most striking feature of the Prince bill, introduced at the instigation of Newark automobilists, is its incorporation of the Leavitt retaliation act. This provides that the residents of other States shall be taxed for the privilege of running a car in New Jersey exactly what New Jerseyites would have to pay for operation in other States.

Further, the bill provides that non-resident automobilists shall have a free touring privilege of fifteen days in this State, but that on entering they must register and sign a power of attorney as now made necessary by the Frelinghuysen law.

New York Automobile Incorporations

ALBANY, N. Y., April 17—The following incorporations have been made: The St. John Corporation, $20,000, to deal in automobiles and accessories in Manhattan, George St. John, Jr., Benj. J. Larue and W. F. Gleeson, incorporators; Universal Oil Converter Company, $10,000, to manufacture accessories used in gasoline engines, M. Lachman, L. S. Lachman and Reginald Hawley, incorporators; the Solex Carburetor Company of America, $150,000, to manufacture carbureters, etc., A. L. Pincoffs, William E. McGuirk and William F. Griffin, incorporators; West End Taxi Service Company, $1,000, to operate taxicabs in Manhattan, H. Howard Babcock, Nathan I. Berger and Abner S. Werblin, incorporators.

Glidden Pathfinder to Start April 24

Carrying H. A. Longstreth, E. L. Ferguson, the official photographer from the establishment of N. Lazarnick, and possibly S. M. Butler, the official pathfinding car for the approaching Glidden Tour will leave Washington on April 24.

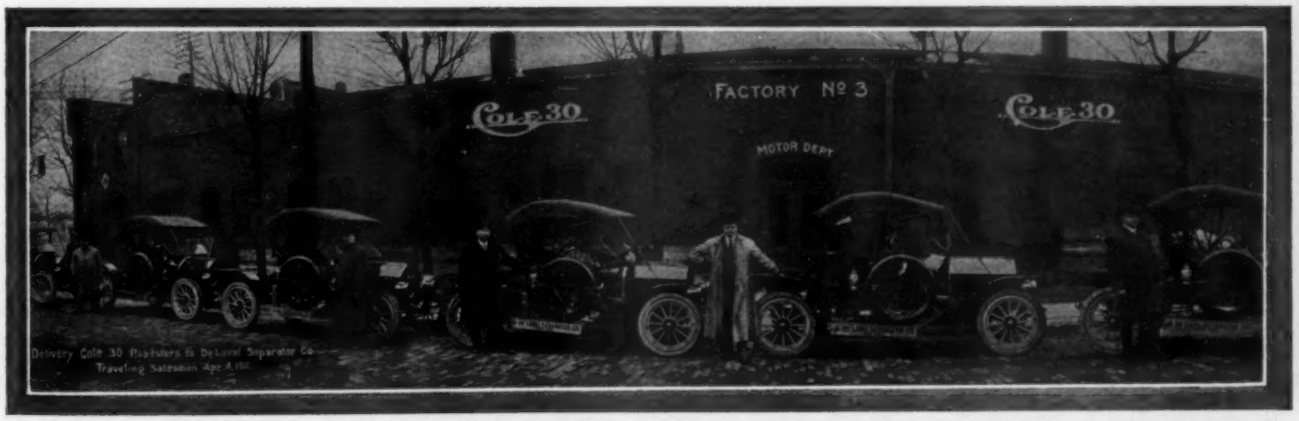
The party will lay out the route for the tour to Ottawa, Canada, including the hill-climb en route at or near Montpelier, Vt. Mr. Ferguson will have charge of preparing the route book.

Second-Hand Car Problem

C. C. Hanch, treasurer of the Nordyke & Marmon Company, at a recent meeting of the Indianapolis Automobile Trade Association had the following to say regarding the second-hand car problem:

"The practice of allowing customers a price for second-hand or used cars materially in excess of the real value of such cars, and in excess of the actual selling price of such cars, results in a cut price on the new car, and, to this extent, is a violation of the equitable principles of the one-price system. The solution of the problem lies in the channel of the application of common sense and equitable treatment. Primarily, it is a wrong to any automobile owner to persuade him to trade in a used car before he has had a reasonable and proper service out of the same. If such a trade is made upon a basis equitable to the dealer, the owner of the used car is forced to sustain excessive depreciation upon his car, and if the used car is traded in on an improvident basis, the dealer is forced to lose his legitimate profit, and ultimately will be incapacitated by financial losses from giving his customers such service as they are entitled to expect. On the other hand, if the dealer does not fail to give legitimate service to the owner of the car who purchased or traded for same on a cut-price basis, it is manifest that the dealer must give the service at the expense of other customers who purchased cars on a basis that afforded the dealer a profit.

"Owing to the inherent nature of the motor car, it is not a machine which in any particular make can be successfully sold by different dealers in the same place. This is just as true of second-hand cars as new cars. The matter of service to be given after sale is made remains a factor just as much, in degree, in the case of second-hand cars as in the event of sale of a new car. Dissatisfaction is bound to result if responsibility for the sale of second-hand cars of any make is divided among different dealers. Under such circumstances there is bound to be either unintentional or intentional misrepresentation relative to the condition of such cars, and buyers of second-hand cars, under such conditions, are going to be misled, and, for this reason, they will become prejudiced against the motor car and the motor-car industry in general. On the other hand, if the second-hand cars of a given locality are repaired, adjusted and sold by a concern making the purchase and sale of second-hand cars its business, the second-hand car customer is more likely to know what he is getting, and to get what he thinks he is purchasing, than under contrary circumstances. The sale of second-hand cars is a business of itself, and must be so handled, as there is no more good reason for legitimate automobile dealers to take in second-hand cars in trade than there is for a legitimate clothing dealer to take in second-hand clothes in trade."



The DeLaval Separator Company, of New York, has found by actual experience that its salesmen can accomplish more and better work in automobiles than on railroad trains. Contracts have been closed with the Cole Motor Car Company to furnish 50 runabouts for this work; the first six cars are shown just before leaving the factory for their respective fields.

New Things Among the Accessories

Friction Type Shock Absorber

The Monarch Shock Absorber, shown in Figs. 1 and 4, is of the friction type and is attached to any car by means of clamps,

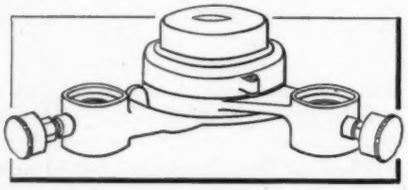


Fig. 1—General appearance of the Monarch Shock Absorber.

thereby obviating the necessity of frame drilling. The cap F in Fig. 4 acts as a grease retainer for lubrication purposes and seals the mechanism from dust. A and B are a pair of short pivoted arms that are attached to the frame and spring base or axle. The connections with the car are by means of ball sockets 4 and stud yokes and are fitted with grease cups. A and B rotatively engage by dust-proof circular ledges 2. The inclines 3 are rotatively engaged by the corresponding inclines of the spring pressed follower C, and the desired pressure is obtained by the adjustment of the bolt E and the nut. In action either way the follower C rides the inclines, which increases the compression of the spring D, thereby increasing the resistance. The device is manufactured by Wellington P. Kidder, Jamaica Plain, Boston, Mass.

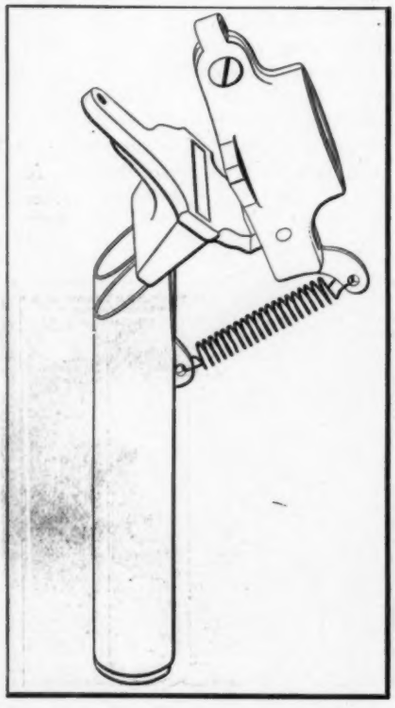


Fig. 2—EXO warning signal for attachment to the end of the muffler outlet pipe by means of a clamp.

Portable Oil Burner Outfit

In Fig. 3 is shown the "Hauck" portable oil burner outfit intended for use in all kinds of repair work where heat is required. The outfit consists of a seamless tank T with a hand air pump P, two sets of burners B1 and B2 connected by means of hose. The burners are held by means of adjustable clamps on stands S and S1, which retain them in any desired position. The burners are of the independent self-contained type and use kerosene oil as

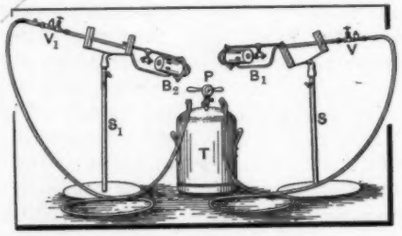


Fig. 3—The Hauck portable oil burner outfit, consisting of a tank and burners attached to adjustable stands.

fuel. Flame can be regulated by the valves V and V1 so that they are always under the control of the operator. The outfit is the product of the Hauck Manufacturing Company, 140 Livingston street, Brooklyn.

Signal Operated from Exhaust

Bronze, with drawn seamless brass sounding tubes, is the material of which the exhaust whistle shown in Fig. 2, and known as the "EXO," is constructed. It is clamped around the end of the manifold outlet pipe. The whistle part of the attachment is held out of operation by the spring shown in the illustration.

The equipment comprises the signaling device shown as well as a pedal for operation and a length of cable, and is manufactured by the Troy Auto Specialty Company, Troy, N. Y.

Compact Valve-Grinding Tool

The valve-grinding tool shown in Fig. 5 enables the operator to grind in the valves of a motor without changing the position of the tool. The oscillating motion is obtained by placing the tongued end of the

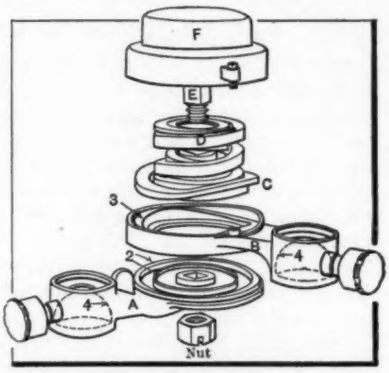


Fig. 4—Monarch Shock Absorber in parts, showing the means by which the friction is obtained.

tool in the slot in the head of the valve and moving the lever arm up and down. The spiral causes the tool to revolve in one direction when the lever is raised and to reverse the motion when it is lowered. A spring shown in the illustration is placed under the valve head and is sufficiently strong to cause the valve to lift slightly off its seat. The Russell valve grinder is manufactured by the Flexible Valve Remover Company, Providence, R. I., and the sole distributor is T. F. Russell & Company, 176 Federal street, Boston, Mass.

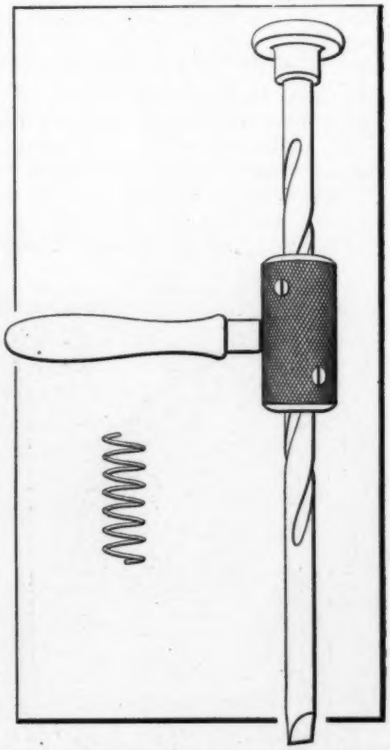


Fig. 5—A valve-grinder with which valves may be ground without changing position of tool.